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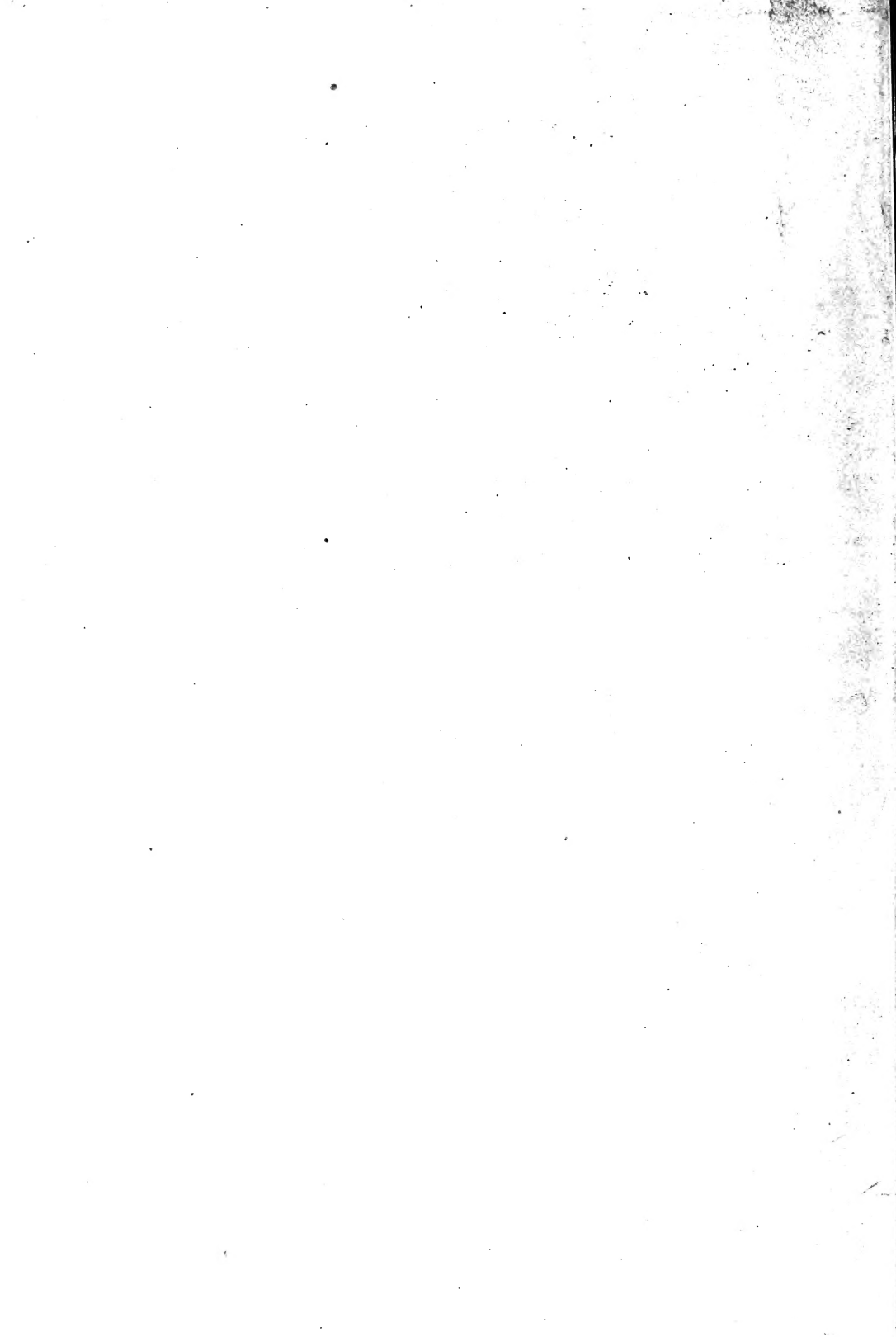


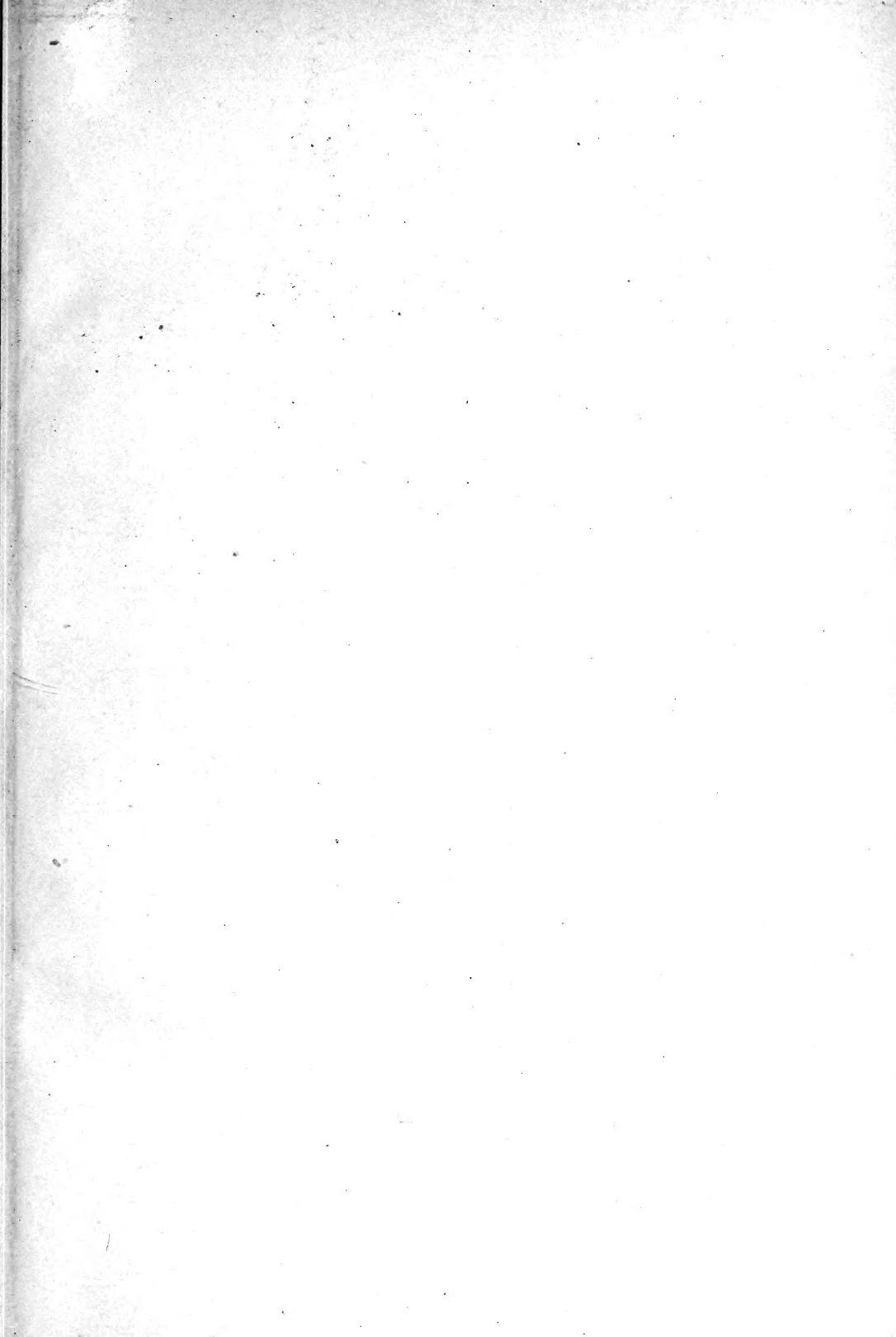




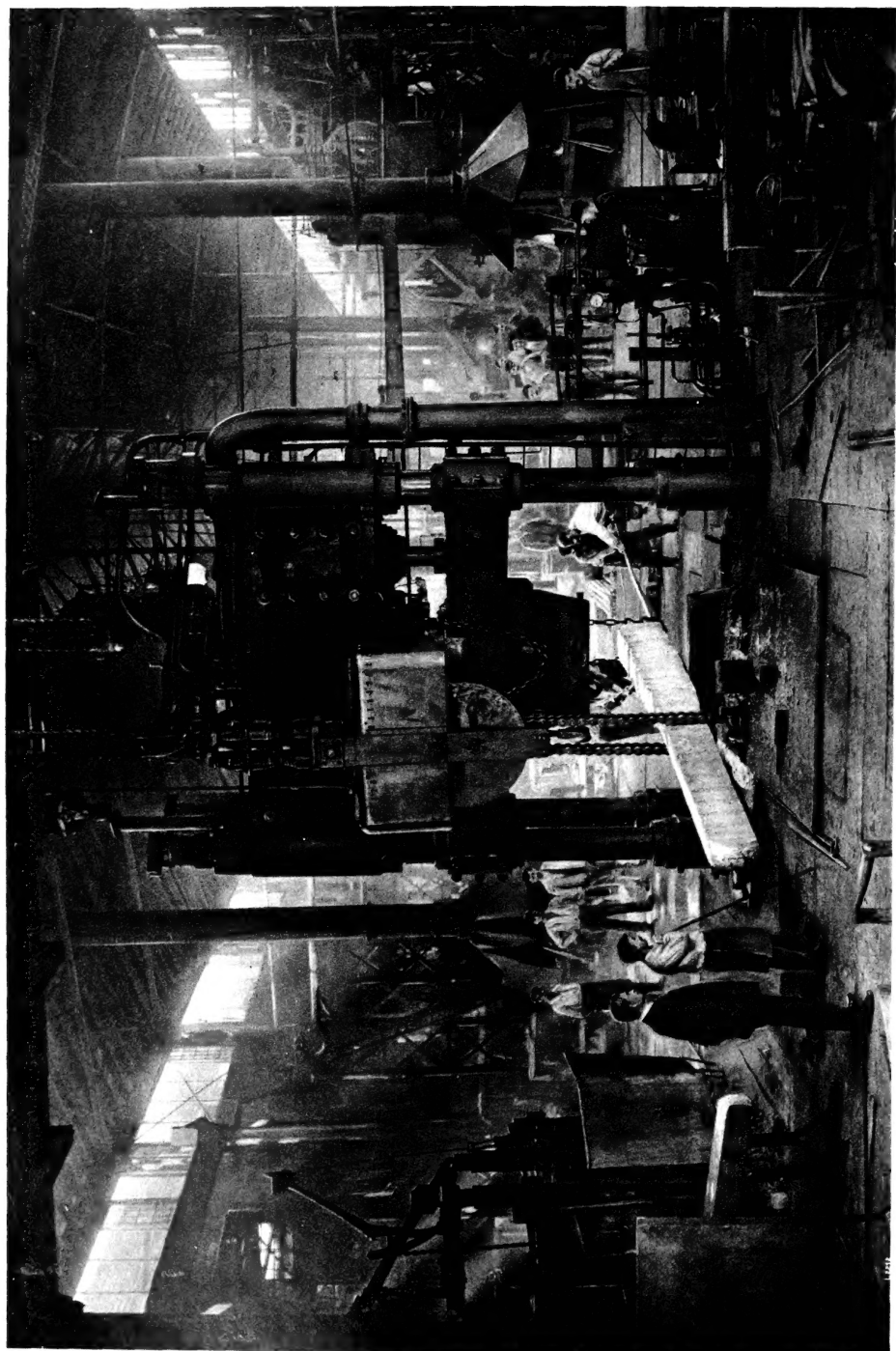
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SCENE IN ONE OF THE WORLD'S LARGEST WORKSHOPS WHERE A BAR OF RED-HOT  
STEEL IS BEING PLACED ON THE ANVIL OF A STEAM HAMMER OR DRAIL-FORGING PRESS

*Engineering*

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# HARMSWORTH'S UNIVERSAL ENCYCLOPEDIA

## VOLUME 5

**Drill** OR DRILLING (Ger. *Drillich*, Lat. *trilix*, triple-threaded). Strong linen or cotton fabric used to make suits for wear in the tropics. Khaki cotton drill is worn by troops on service in hot climates. The pattern is a twill, often of a round, screw-like diagonal, and the tightly twisted warp yarn is predominant upon the surface. Cotton drills are employed for pocketing and frequently for corset making, and other purposes for which strong stuff is required.

**Drin.** River of the Balkans. It is formed by the union, at Kula Liamu, of the White Drin, rising in the Albanian Mts., and the Black Drin, issuing from Lake Ochrida, and flows into the Adriatic below Alessio, after a course of 110 m. Anciently it was known as the Drilo or Drilon. During the Great War the gorges of the two streams and of the main river were traversed by the Serbians in their retreat to the sea in 1915.

**Drina.** River of S.E. Europe, forming part of the boundary between Serbia and Bosnia. It rises among the mountains of E. Montenegro in several headstreams, the chief of which is the Tara, and flows N., N.W., and then N.E. to effect a junction with the Save, 58 m. W. of Belgrade. The principal of its many affluents is the Lim. Its length is 160 m.

**Drina, BATTLE OF THE.** Fought in Sept., 1914, between the Austrians and the Serbians. It began Sept. 8 and 9, 1914, with the Austrian crossing of the river in their second invasion of Serbia. The attack developed more strongly in the S. of the region bordering the Drina than in the N., where the Serbians were in force and threw back the invaders.

The critical fighting took place among the mountains S. of the Jadar. At the outset the Serbians, under pressure of much superior forces, were pushed from some of their positions on the Gucevo, Boranja, and Jagodnia ranges. By Sept. 11 the Austrians held Shabat, while the Sokolska Planina as far as Petska was in their hands. On Sept. 14 the Serbians, who had been reinforced from the N., attacked the Gucevo heights and carried Kulishite, but, fearing envelopment, retired from it. Three days later they renewed

the engagement, and drove the Austrians from it to the Drina. Southward, on Sept. 16, the Serbians stormed the summits of the Sokolska, and drove the enemy in disorder to the river. Thereafter the struggle centred on the commanding position of Matchko Kamen or the Cat's Leg, which was taken and retaken eight times. Finally both sides, being exhausted, settled down to trench warfare, and, the battle of the Drina died away, the advantage resting with the Serbians. See Serbia, Conquest of.

**Drink.** Drama adapted by Charles Reade from Zola's *L'Assommoir*, and produced June 2, 1879, at The Princess's, where it had a run of 222 performances. Charles Warner (*q.v.*) achieved his greatest success in the part of the drunken workman, Coupeau.

**Drink Traffic.** Name given to the trade of making and selling intoxicating liquors. Owing to the evils caused by excessive drinking this trade is subject throughout the civilized world to special control by the state. See Liquor Control; Local Option; Prohibition; Temperance Movement.

**Drinkwater, JOHN** (b. 1882). British poet and critic. He was born June 1, 1882, the son of an actor, and educated at Oxford High School. He was for a time a clerk in an insurance office, and published his first volume of verse in 1908. One of the founders of the Pilgrim



John Drinkwater,  
British poet  
Hoppe

Players, he became manager of the Repertory Theatre, Birmingham. His published work includes an essay on the Lyric, 1916; studies of William Morris, 1912, and of Swinburne, 1913; two plays in verse, *Cophetua*, 1911, and *Rebellion*, 1914, and several volumes of poetry. His play, *Abraham Lincoln*, produced at Birmingham in 1918, had a long run at The Lyric, Hammer-smith, in 1919. Later plays were *Oliver Cromwell* and *Mary Stuart*.

**Drystone.** In architecture, the projecting tablet or moulding placed on the crown of an arch, window, or doorway. See Moulding.

**Driscoll, JIM** (1880-1925), Professional boxer. Born at Cardiff, Dec. 15, 1880, he has more than 50 victories to his credit. He secured the feather-weight championship in 1910, and became the winner outright of the Lonsdale belt for that weight. His two defeats were by Harry Mansfield in 1904 and by Freddy Welsh (*q.v.*), to whom he lost on a foul in the tenth round, at Cardiff, Dec. 20, 1910. Driscoll announced his retirement from boxing after his drawn battle with Owen Moran, Jan. 27, 1913. He died Jan. 30, 1925.

**Driver.** Longest club in a golfer's outfit, with a wooden head and almost straight face, used for tee shots. The beginner should learn to drive with a brassie, and when he can use this club successfully, should procure a driver with a similar lie and of equal length to the brassie. Only when the ball "sits up" well is it possible to use the driver through the green. See Golf.

**Driver, SAMUEL ROLLES** (1846-1914). British Biblical scholar. Born at Southampton, Oct. 2, 1846, he was educated at Winchester and New College, Oxford, where he took high honours. He was a fellow of New College, 1870-73; tutor 1875-83; a member of the O.T. Revision company, 1876-84; and Regius professor of Hebrew and canon of Christ Church, Oxford, from 1883 until his death, Feb. 26, 1914.



S. R. Driver  
Elliott & Fry

One of the greatest Hebraic scholars of his time, Driver collaborated with F. Brown and C. A. Briggs in editing A Hebrew and English Lexicon of the Old Testament, 1906 (based on E. Robinson's translation of the work of F. H. W. Gesenius). His Introduction to the Literature of the Old Testament, 1891, aroused much controversy, but with his other writings is now generally held to reconcile what is known as the higher criticism of the O.T. with a sincere belief in its inspiration and religious authority. His other works include A Treatise on the

Use of the Tenses in Hebrew, 1874; a revised translation of Jeremiah, 1906; commentaries on various books of the O.T.; The Parallel Psalter, 1898; and Modern Research as Illustrating the Bible, 1909.

**Driving.** Controlling and guiding a horse or horses harnessed to any vehicle. The British have always excelled as whips, as is shown by the records of the Brighton road in the times of the Regency and of the coaching period of the 18th and early 19th centuries. But in modern times mechanically propelled are rapidly displacing horse-drawn vehicles, and skilful driving has become rather a pastime than a necessity.

In driving a single horse the reins should be taken in the left hand, the left or near side rein being held between the forefinger and thumb, and the off-side or right-hand one between the second and third fingers. The arm should be held at almost a right angle across the body, with the hand about 6 ins. in front of the bottom

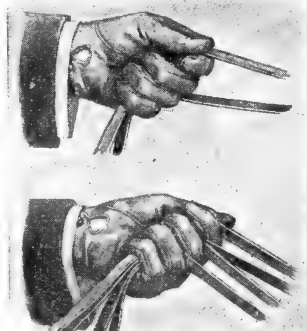
sure put upon a horse's mouth in guiding him and the give and take of the driver's hand or hands to the pull of the horse. This is more often a gift than an acquirement.

In Great Britain there are hazy and fast rules of the road to be observed when driving. The left-hand side of the road is always adhered to and retained when passing another vehicle coming in the opposite direction. When overtaking anything going in the same direction, it is necessary to draw towards the middle of the road and pass on the right side. See Horse; Riding.

**Bibliography.** Hints on Driving, C. S. Ward, 1870; Driving, 8th Duke of Beaufort, 4th ed. 1894 (in Badminton Lib.); Driving, F. M. Ware, 1904; The Law of the Road, J. W. Thatcher and D. H. J. Hartley, 1909.

**Driving Band.** Metal strips placed round shells. Made of soft metal, usually copper or cupronickel, they are secured round the bodies of shells to fill up the grooves of the rifling in the barrel, thus giving the shell a rotary motion and preventing the gases from the propellant charge escaping past the projectile. In the early types of shell, of cylindrical shape, for use in breech-loading rifled guns, it was usual to provide a complete lead jacket to serve this purpose, this being superseded by a wide lead band at the centre of the shell. At the present time copper is the metal most used, and generally one narrow band near the base of the shell is sufficient, except for very powerful guns. The bands are fitted in grooves turned in the body of the shell, the base of the groove being either roughened or provided with wavy prominences and the band secured being shrunk on.

In general the driving band is fitted as close to the base of the shell as is consistent with the ability of the steel to resist the base of the shell being pulled off. See Shell; Windage.



Driving. How reins should be held when driving a four-in-hand; above, hand grip for single reins

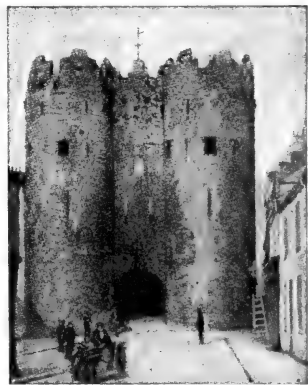
buttons of the waistcoat; this will enable the right hand to be easily used when it becomes necessary to employ both hands. In driving a pair the reins are held in the same manner, but since there are two horses to control instead of one the task is more difficult as they may not pull equally. It is impossible to give in words an adequate description of the manipulation of the reins in driving tandem or four-in-hand; instruction and practical illustration should be sought from an expert. Tandem, the driving of two horses, one in front of the other, attached to a dogcart, was once greatly favoured, but is now seldom seen except at horse shows.

The term "hands," of which the novice will hear much discussion, implies the exact weight or pres-

**Drocourt.** Village of France, in the dept. of Pas-de-Calais. It is 6 m. S.E. of Lens, and was the N. end of the German Wotan, or switch, line which ran S. to Quéant, forming part of the Hindenburg Line. The Drocourt-Quéant line was stormed by the Canadians on Sept. 2, 1918, in the fifth battle of Arras (q.v.). The village was captured Sept. 27. A memorial is to be erected by the Canadian Government at Dury, midway between Drocourt and Quéant, to commemorate this feat. Dury was captured from the Germans on Sept. 2.

**Droeshout, MARTIN** (fl. 1620-51). English engraver. Probably of Dutch extraction, he came to reside in England some time previous to 1623, in which year was published his frontispiece portrait of Shakespeare in the first folio edition of the Comedies, Histories, and Tragedies. Among other portraits engraved by him were those of John Foxe, the martyrologist, and John Donne, dean of S. Paul's.

**Drogheda.** Mun. bor., seaport, and market town of Co. Louth, Ireland. It stands on the Boyne, 4 m.



Drogheda. S. Lawrence Gate, on the N. side of the town; it is believed to date from the 12th century

from Drogheda Bay, and 32 m. N. of Dublin by the G.N.I.R. It has a good harbour and a brisk trade in cattle, sheep, and agricultural produce; linens, cottons, beer, soap, etc., are manufactured. Market day, Sat. Pop. 12,501. In 1649 Cromwell entered the town and massacred its defenders, and it was surrendered by James II in 1690. Pron. Droh-he-da.

**Drogheda Bay.** Bay on the E. coast of Ireland adjacent to the counties of Louth, Meath, and Dublin. From Clogher Head in the N. to the Skerries in the S. the distance is 25 m. The estuary of the river Boyne forms a deep indentation useful for coastwise shipping.



Drogheda Bay, on the E. coast of Ireland

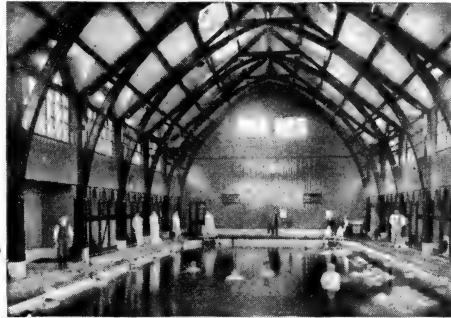
**Drogheda, EARL OF.** Irish title borne since 1661 by the family of Moore. The family traces its descent to two brothers, Edward and Thomas, who settled in Ireland in the time of Elizabeth. Edward obtained some former monastic lands in co. Louth, and his descendant, Garrett, was made a baron and a viscount by James I. President of Munster and an Irish M.P., he had previously served Elizabeth against the rebels. His son Henry, 2nd Viscount Moore, married a daughter of Viscount Loftus, whose son Henry inherited from the Moores estates in Kildare.

In 1661 Henry Moore was created earl of Drogheda, perhaps as a reward for his father's loyalty to Charles I, and from him the present earl is descended. Charles, the 6th earl (1730-1821), entered the army and rose to be a field-marshal and master-general of the ordnance. In 1791 he was made marquess of Drogheda, and in 1801 a baron of the United Kingdom. When his grandson, the 3rd marquess, died in 1892, the marquessate became extinct, but the earldom passed to a cousin, a descendant of the 5th earl. In 1908 Henry Charles Ponsonby Moore (b. 1884) became the 10th earl. His seat is Moore Abbey, co. Kildare, wherein his estates mainly lie; his eldest son is known as Viscount Moore.

*Pron.* Dro-heda.

**Drohobycz.** Town in the Galician province of Poland, 17 m. W. of Strýj. It has a fine Gothic church and is a rly. junction for lines to the neighbouring oil wells at Boryslaw. Pop. 20,000; 36 p.c. are Poles, 33 p.c. Germans, and the rest Ruthenes. Nearly half the inhabitants are Jews.

**Droitwich.** Mun. bor. and market town of Worcestershire, England. It stands on the Solwarpe,  $\frac{5}{8}$  m. N.E. of Worcester and 126 m. N.W. of London, and is served by the G.W. and Mid. Rlys., while a canal connects it with the Severn. It is a market for agricultural produce, but the chief industry is the production of rock salt. It is chiefly known, however, as a watering-place. Its brine springs have radio-active properties and are efficacious for rheumatism, neuritis, gout, etc. There are fine baths, hotels, etc., for visitors, and a public park. Droitwich has two old churches, S. Andrew's and S. Peter's. In the older part of the town the ground has subsided a good deal owing to the pumping out of the brine. It became a corporate town in 1554, and is now governed by a mayor and corporation. Market day, Fri. Pop. 4,146.



Droitwich, Worcestershire. Interior of large brine swimming bath

**Drôme.** Department of France. It lies in the S.E. of the country and has an area of 2,532 sq. m. It is a mountainous region, especially in the Alpine E. The Rhône forms its western boundary, while the Isère, the Drôme, and other tributaries also drain it. Agriculture is the chief industry. Wheat is grown in the valleys, especially in the fertile district of Valloire. Vines are widely cultivated, and olives, figs, and mulberries are important crops. Silkworms are largely produced. Many cattle are reared on the extensive uplands. Valence is the capital and other towns are Die, Nyons, Crest, Romans, and Montélimar. It is divided into four arrondissements, and before 1790 was part of the provinces of Dauphiné and Provence. Pop. 290,894.

**Dromedary.** In zoology, the one-humped camel (*Camelus dromedarius*) of Arabia and N. Africa. In common speech the term is used for riding camels as distinguished from the heavier baggage animals. The late Latin name *dromedarius* (classical form *dromas*) comes from Gr. *dromas*, running. See Camel.

**Dromio.** Name of two comic characters, twin brothers, in Shakespeare's *The Comedy of Errors* (q.v.).

**Dromore.** Urban dist. and mkt. town of co. Down, Ireland. It stands on the Lagan,  $17\frac{1}{2}$  m. S.W. of Belfast, by the G.N.I.R. An ancient town, Dromore was formerly the seat of a bishopric, which was united to Down and Connor in 1842. Both town and cathedral were destroyed during the insurrection of 1641; the present church contains the tomb of Bishop Jeremy Taylor, its builder. There are castle ruins and a large Danish encampment. Linen is manufactured in the town. Market day, Monday. Pop. 2,384.

**Drone.** Name given to the male of the honey bee. It is intermediate in size between the queen bee and the workers, and is stingless. It does not work, and its only function is to fertilise the queen. At the be-

ginning of autumn, all the drones in the hive are killed or driven out to starve by the workers. See Bee.

**Drone.** In music the pipe or pipes, in instruments of the bagpipe class, on which the sustained and unaltering bass tones are produced. The melody pipe is called the Chanter. See Bagpipe; Chanter.

**Drontheim.** Alternative spelling of the name of the Norwegian city of Trondheim (q.v.).

**Drood, EDWIN.** Character from whom Charles Dickens's last and unfinished novel, *The Mystery of Edwin Drood*, 1870, takes its name. He is betrothed in infancy to Rosa Bud, quarrels with Neville Landless, and after a reconciliation mysteriously disappears.

In 1907 an attempt was made to prove that Dickens founded the story on personal recollections of T. C. Druce, owner of the Baker Street Bazaar. Several attempts have been made to trace the probable course of the novel, notably by J. C. Waters, 1905, and W. Robertson Nicoll, 1912. Of dramatized versions one by J. Comyns Carr was produced at Cardiff, Nov. 21, 1907, and at His Majesty's Theatre, London, Jan. 4, 1908.

**Dropmore.** Hamlet of Buckinghamshire, England. It is 4 m. N.E. of Maidenhead, and 2½ m. from the station at Bourne End on the G.W.R. It is famous for the mansion and grounds here. The gardens, among the most extensive and remarkable in England, include an Italian garden and a Pinetum. They were laid out by the prime minister, Lord Grenville, 1801-5. In 1920 the estate belonged to J. B. Fortescue. Pop. 350. The Dropmore Papers, published by the Hist. MSS. Comm., contain political correspondence of the time of Grenville.

**Dropped Wrist.** Condition in which the extensors of the hand, i.e. the muscles which bend the hand backwards, are paralysed, and when the arm is raised the hand hangs loosely and helplessly downwards. It may be due to injury or disease of the nerves supplying these muscles, and is not infrequently a symptom of chronic lead poisoning. The course of treatment depends upon the cause, the outlook for recovery or improvement being better when it is due to injury than when resulting from disease.



**Dropsy** (Gr. *hydrops*, from *hydor*, water). Accumulation of fluid—the watery part of the blood—in the tissues and cavities of the body. Dropsy arises in conditions which impede the normal circulation of the blood and increase the pressure in the vessels, causing fluid to transude through their walls. The commonest conditions giving rise to general dropsy are disease of the heart, kidneys, and liver. Localised dropsy, or *oedema*, may result from local weakness of the vessels, as in varicose veins, and from inflammation.

Dropsy is generally first noticeable in puffiness of the eyelids, and in swelling of the ankles. If the swollen tissues be pressed with the tip of the finger, a small depression is produced which persists for a brief interval. In more advanced cases fluid collects in the abdominal cavity, producing the condition known as *ascites* (*q.v.*), which sometimes leads to great distension of the abdomen. Accumulation of fluid in the lungs causes a "water-logging" of the organs which may bring about difficulty in breathing, and cough.

Treatment must be directed towards the cause of the condition, but frequently great relief is afforded by measures which drain the body of fluids, such as the administration of diuretics to stimulate the flow of urine, and purgatives, which cause copious watery evacuations. In severe cases of accumulation of fluid in the abdomen or pleural cavities, tapping may be adopted.

**Dropwort** (*Spiraea filipendula*). Perennial herb of the natural order Rosaceae. A native of Europe, N. Africa, and N. Asia, it is a plant of downs and dry pastures. It has an erect, grooved stem, 2 ft. or 3 ft. high. The leaves are chiefly from the rootstock, broken into many pairs of deeply-toothed leaflets. The small, but numerous, white flowers are rosy on the outside, and borne in panicles.

**Droseraceae** (Gr. *droseros*, dewy). Natural order of perennial herbs, of wide distribution in marshy places. It consists of six genera and over 100 species. The flowers consist of four to eight sepals, a similar number of petals, 4–20 stamens and 1–5 styles. They are all insectivorous, catching their prey by various means and digesting the bodies, upon which they mainly subsist. All have poor roots—in one species none at all. See Sundew; also *illus.* p. 1219.

**Droshky**. Russian word meaning a little wagon. A droshky is a light carriage on four wheels and without a covering. The first

droshkies were formed of a board placed across two pairs of wheels, enabling the passengers to sit sideways, as in an Irish jaunting car.

**Drossing Oven**. Furnace used in the manufacture of red lead. In that process pig lead is melted in a low-arched furnace, that has a bed formed of firebricks supported on a cast-iron base and provided with openings for introducing the fuel and the metal. The molten metal is rabbled about in this furnace and thus exposed to air until it is converted into oxide or litharge. The temperature is not allowed to rise sufficiently high to melt the litharge. What in effect is done is, to use the works' term, to convert the lead into a dross. See Lead.

**Droste-Hülshoff**, ANNETTE ELISABETH, BARONESS VON (1797–1848). German poet. Born at Hülshoff, near Münster, Jan. 10, 1797, she came under the influence of her cousin, afterwards archbishop of Cologne. Her principal works are Poems, 1838; and the



Dropwort. Perennial herb, which grows on downs and dry pasture land

Spiritual Year, 1851. She died at Meersburg, on Lake Constance, May 24, 1848.

**Drouais**, FRANÇOIS HUBERT (1727–75). French portrait painter. Born at Paris, Dec. 14, 1727, he studied under his father, Hubert Drouais, a miniature painter, Van Loo, Boucher, and Natoire. He became an academician in 1758; and a little later painter to the court. Notable portraits by him are those of the Pompadour (at Orleans) and the Comte d'Artois (in the Louvre). He died in Paris, Oct. 21, 1775.

His son, Jean Germain (1763–88), also a painter, born at Paris, Nov. 25, 1763, studied with his



Droshky. Light vehicle which plies for hire on the streets in Russia

father and with J. L. David (*q.v.*). In 1784 he won the prix de Rome with his Woman of Canaan at the Feet of Jesus Christ, and in 1785 accompanied David to Italy. He died at Rome, Feb. 13, 1788.

**Drouet**, JEAN BAPTISTE, COMTE D'ERLON (1765–1844). French soldier. Born at Reims, July 29, 1765, he entered the army as a private in 1782, and had risen to the rank of brigadier-general by 1799. He played a prominent part at Jena and in the closing stages of the Peninsular War. Imprisoned in the citadel of Lille for alleged complicity in an anti-Bourbon conspiracy, when Napoleon returned from Elba in 1815 he escaped and seized and held the citadel for his old master.



J. B. Drouet, French soldier

After the Waterloo campaign, in which he took part, Drouet went into exile, but returned to Paris in 1825. In 1834–35 he was governor of Algeria, and in 1843 was made a marshal. He died at Paris, Jan. 25, 1844.

**Drought**. Spell of dry weather sufficiently long to cause serious deficiency in the supply of water. Countries which normally receive the greater part of their rainfall at one season often suffer from droughts during the dry season. Thus the countries bordering the Mediterranean Sea, and those in similar latitudes on the W. of continents, whether N. or S. of the equator, *e.g.* California in N. America and Central Chile in S. America, have most rain in winter, while the summers are droughty. Conversely, countries having a monsoon type of climate, *e.g.* India, have wet summers and droughty winters.

Vast areas where prolonged droughts are experienced at all seasons, *i.e.* arid desert lands, are chiefly found on the W. of continents in the latitudes of the Trade Winds. The type of pressure distribution largely determines rainfall

or drought. Low pressure cyclones generally mean rain, but the high pressure of anti-cyclones usually gives dry weather, so that prolonged periods of anti-cyclonic weather cause drought. See Climate; Flood; Weather.

**Drouyn de Lhuys, Édouard** (1805-81). French statesman.

Born in Paris, Nov. 19, 1805, he entered the diplomatic service and was employed in the embassies at Madrid and The Hague. In 1840 he became chief of the commercial department in the ministry of

foreign affairs, but, going into opposition, he lost his place. By Louis Napoleon he was appointed minister of foreign affairs in 1848, and from 1849-51 he was ambassador in London, returning to Paris in 1851 to be foreign minister. He resigned office in 1855, but held the portfolio again from 1863-66. On the downfall of Napoleon III in 1871 he took refuge in Jersey. He died in Paris, March 1, 1881.

**Driver.** Variant form of driver, restricted to drivers of sheep or cattle. Before the invention of railways a large class of men engaged in this occupation, making long journeys on foot with the cattle in their charge. See Cattle.

**Drowning.** Death from asphyxia owing to submersion of the mouth and nostrils beneath water or other fluid. Sometimes, however, shock or syncope, caused by the sudden immersion in cold water and the state of terror experienced by the individual, combines with asphyxia in causing death. The number and causes of death from drowning in England and Wales in 1918 are shown as follows:

	Accident and Negligence	Suicide	Murder
Males ..	1,704	339	7
Females..	402	349	13
Total ..	2,106	688	20

**POST-MORTEM APPEARANCES.** The face is usually ashy pale, but in some cases is slightly livid, with rosy patches about the cheeks. A characteristic sign is the presence of fine froth, sometimes tinged with blood, about the mouth and nostrils. *Rigor mortis* comes on early. The condition known as cadaveric spasm, a form of rigidity occurring at the moment of death, is sometimes observed, and articles grasped

during the death-struggle, such as reeds or plants, may be found firmly clenched in the hands. This is a valuable indication in distinguishing cases of drowning from cases in which the body was thrown into water after death. Internally the air-passages are found to contain a clear or blood-stained froth, and perhaps mud or portions of water-plants. The lungs are voluminous and distended, and when cut into exude a frothy, blood-stained fluid. Minute haemorrhages may be observed beneath the pleura, and the right side of the heart may be engorged with venous blood, the left being comparatively empty. The presence of water in the stomach, particularly if it contains pond-weed, etc., is virtually a conclusive sign of death from drowning, since experiments have shown that water very rarely enters the stomach of a body immersed after death.

**DIRECTIONS FOR RESCUERS.** Great care and presence of mind are required when endeavouring to rescue a person who cannot swim, since the rescuer may be clutched and his movements impeded, while he runs the risk of being drowned himself. When the drowning person is struggling, the rescuer should leave him for a few seconds until he becomes quiet; then seize him by the hair, turn him on his back, and swim on the back towards the shore, or support him face upwards in this way until a boat arrives. Should the rescuer be clutched the best plan is for him to take a full breath and allow himself to be drawn under, when the drowning person will almost always release his grip. If he does not let go, the rescuer must try to break away by forcing his knees against the chest of the drowning person.

**TREATMENT AFTER RESCUE.** When a person is recovered from water in an apparently lifeless condition, artificial respiration should be resorted to as soon as the sufferer is in the boat or has been brought to the shore. The most convenient method of performing artificial respiration is that recommended by Schäfer (see Figs. 3, 4, p. 656). The finger is introduced into the mouth in order to clear out any mud or froth, and the patient is then placed face downwards, the head being turned towards the side. The attendant kneels either by the side of or astride the patient, and, spreading his hands over the lower part of the back and sides of the chest, gradually throws his weight forward so as to exert a firm, steady pressure upon the thorax. He then swings

backwards, so as to relax the pressure and allow the lungs to expand. This backward and forward movement should take about five seconds, and should be repeated at the rate of about twelve times a minute.

While artificial respiration is being performed further restorative measures should be applied. The wet clothing should be drawn off, the body wiped dry and covered with hot blankets, and hot bottles may be placed to the feet, care being taken that these are not so hot as to burn the skin. Friction of the limbs from below upwards is useful. Ammonia may be cautiously held to the nostrils, and a hypodermic injection of strychnine may be given. When breathing is established a hot bath is a useful means of restoring the bodily heat. See First Aid; consult also Forensic Medicine and Toxicology, J. D. Mann, 5th ed. revised, 1914. W. A. Brand, M.D.

**Droydsden.** Urb. dist. and small town of Lancashire, England. It stands on the Rochdale Canal, 5 m. E. of Manchester by the L. & N.W.R. There are cotton and print factories, and dye and chemical works. Pop. 13,259.

**Droysen, JOHANN GUSTAV** (1808-84). German historian. Born at Treptow, Pomerania, July 6, 1808,



J. G. Droysen,  
German historian

and educated at Stettin and Berlin, from 1840-51 Droysen was professor of history at Kiel, from 1851-59 at Jena, and from 1859-84 at Berlin.

**Droysen's rôle** as an historian was to glorify Prussia and her rulers, which he did especially in his monumental History of Prussian Policy, 14 vols., 1855-86. The central idea of this work is that Germany's destiny was to place herself under the rule of the Hohenzollerns. It takes the story down to 1756, and bears marks of infinite labour.

Droysen wrote, as an historian, in favour of Prussia's claim to the duchies of Slesvig and Holstein, and as a politician he took part in the Frankfurt parliament of 1848. He wrote in early life a valuable History of Alexander the Great, 1833; a History of Hellenism 1836-43; and a life of the Prussian soldier Yorck von Wartenburg, 1851-52. He died in Berlin, June 19, 1884. His son Gustav was the editor of the well-known Historical Atlas, 1885, and wrote several historical works.

**Dru**, AIGUILLE DU. Rocky needle or peak in the Mont Blanc chain, near the Aiguille Verte. The Grand Dru or Pointe Este (alt. 12,320 ft.) was first ascended by Dent and Hartley in 1878; the Petit Dru or Pointe Charlet (alt. 12,244 ft.) by Charlet-Straton in 1879. See Alps.

**Drug**. Medicinal substance obtained from the vegetable and mineral kingdoms. The term also includes the substances as prepared for use in the treatment of disease, but these are better distinguished as pharmaceutical preparations. Sometimes the word is employed to indicate narcotic substances, such as opium and cocaine.

London is the world's chief port for drugs, hundreds of which arrive in the crude state from all parts of the world. They are stored in special warehouses at the docks, and the importers hold drug auction sales about twice a month at the Commercial Sales Rooms, Mincing Lane, the purchasers generally being wholesale druggists or exporters. Cinchona bark is brought to Amsterdam, because the Dutch colonies are now its chief producers. Liverpool is the port for American drugs. In the case of wholesale druggists the drug, as imported, generally has to be sorted over—"garbled," as it is known in the trade—to separate the various grades. For example, pieces of rhubarb root of fine appearance are reserved for selling retail to the public, but broken pieces are equally well suited for reducing to powder, or for pharmaceutical preparations. Some drugs, such as aconite, belladonna, digitalis, henbane, lavender, peppermint, etc., are grown in Great Britain. Others require warm or moist climates for their successful cultivation.

**DRUG HABITS**. Continuous taking of certain drugs produces in some persons an irresistible craving for them, despite their injurious effect upon both mind and body. The commonest instances are addiction to alcohol and smoking. The less frequent drug-habits—such as the taking of opium or cocaine—may originate in taking the drug in the first instance under medical orders, its use being continued because of pleasurable sensations produced.

Many victims display a progressive deterioration of their moral faculties, and when fully in the grip of the habit will lie freely and resort to any tricks to satisfy their craving. Another characteristic feature is the marked degree of tolerance acquired after taking a drug for a considerable time, the victim of a



Dru. View of the Aiguille du Dru, near Chamonix

drug habit sometimes taking daily an amount of poison which would be fatal in an ordinary person.

In most cases the habit of taking opium is initiated by taking the drug to relieve pain, and is more frequent in women than in men. Morphia may be injected hypodermically, laudanum drunk, or solid opium eaten; opium smoking is more common in the East than in Europe. Those who are addicted to this habit become pale or sallow, and suffer from nausea, vomiting, loss of appetite, sleeplessness, and emaciation. Periods of severe mental depression follow the temporary exaltation at first produced by a dose. The temper becomes irritable, and the moral faculties degenerate, the sufferer becoming untruthful and utterly unreliable.

Delusions and hallucinations may occur. Remarkable tolerance for opium may be established. De Quincey (*q.v.*) states that at one period he was taking 320 grains of opium a day, the full Pharmacopoeial dose being two grains. When the habit is definitely established, it needs strong will-power to overcome it. The patient should enter a home or institution where he will be unable to obtain the drug. When the habit has not been of long duration, it may be possible to stop the drug at once, or reduce it very rapidly, but in long-standing cases the symptoms induced by abrupt withdrawal may be severe, and it is generally advisable to reduce the drug gradually.

The habitual taking of chloral hydrate is nearly always started by its use to prevent sleeplessness. The symptoms of chronic poisoning which gradually develop are dys-

pepsia, eruptions on the skin, weakness of the heart and respiration, and impairment of mental power. The acquirement of tolerance is not so marked as with opium, and a slightly greater dose than usual may be fatal.

Cocaine is sometimes taken as a constituent of a snuff by persons suffering from nasal catarrh, and in this way the habit is initiated. Both the mental and bodily faculties become affected in course of time.

The taking of Cannabis Indica frequently becomes a habit in Egypt, India, and other Eastern countries, where it is taken in the form of hashish, bang, or ganga. It produces symptoms resembling those of mild intoxication, followed by sleep which is often accompanied by pleasant dreams.

To check the serious growth of the drug habit an act of parliament was passed in 1923 which particularly aimed at the suppression of illicit traffic in cocaine and other dangerous drugs.

**Drug**. District, subdivision, and town of Central Provinces, India, in the Chhatisgarh division. Area, 3,807 sq. m.; pop. 775,688, five-sixths Hindus. Of the total area about one-quarter is under cultivation, rice and wheat being among the chief crops. The town has small metal and weaving industries. Pop. 7,048, four-fifths Hindus.

**Drugget** (Fr. *droguet*, dim. of *drogue*, poor material). Coarse woollen stuff, woven or felted, sometimes printed with a pattern. It is chiefly used as a protection or substitute for carpets. The name is also applied to a stout fabric of linen warp and worsted weft for rough aprons, etc. In early times drugget was much used for clothing, being sometimes partly of silk.

**Druggist**. One of the titles reserved by the Pharmacy Act, 1868, for persons who keep open shop for the sale of poisons and are registered under the Act. The list of poisons which can only be sold retail by registered persons is given in the schedule of the Poisons and Pharmacy Act, 1908, this list replacing the schedule given in the Act of 1868. The sale of poisons wholesale, *i.e.* to retailers only, requires the article to be labelled "poison." The title wholesale druggist is not a protected one. In Ireland the title druggist as regards retail vendors of poisons is regulated by the Pharmacy Act (Ireland), 1875, Amendment Act, 1890. Druggists deal generally in medicinal substances and chemicals required in the arts; in Great Britain they dispense prescriptions, but are not qualified to do so in Ireland.

**Druid.** Priest among the Celtic peoples, especially those of Britain and Gaul. The Druids were among the bitterest opponents of the Roman invaders, and in Britain were virtually exterminated during the Roman domination. The earliest detailed account of them is given by Caesar in his Gallic War, and his account is probably equally applicable to the Druids of Britain, which was the headquarters of Druidism. They are described as priests and law-givers, among whom all nobles and men of dignity were found.

The chief of them was elected, and no hereditary positions were recognized. They were learned in the natural sciences and astrology, while some of the classic writers describe them as sorcerers and masters of medical knowledge (Pliny); and as soothsayers and bards (Strabo). Their worship was carried on in groves, the oak being their sacred tree, and the oak-grown mistletoe played a particular part in their rites. It was cut with a golden weapon by a Druid clothed in white, was received from the tree on a spotless cloth by another Druid, and borne away by white oxen. Druidic worship entailed human sacrifices at special festivals; the victims being impaled, shot with arrows, or burned in wicker cages; the Druids exercising their peculiar art of divination from the movements of their dying victims, as well as from the flight of birds, etc.

The last stand of the Druids in Britain was made at Mona, or Anglesey, when the Romans are said to have exterminated them and destroyed their sacred groves (Tacitus). After being exterminated in Britain, Druids are mainly heard of in Ireland, where tradition associates them with witchcraft and sorcery.

*Bibliography.* Irish Druids and Old Irish Religions, J. Bonwick, 1894; Origin and Growth of Religion as Illustrated by Celtic Heathendom, J. Rhys, 3rd ed. 1898; Social History of Ancient Ireland, P. W. Joyce, 1903; Les Druids et les Dieux Celtiques, M. H. d'Arbois de Jubainville, 1906.



**Druid.** Arminius, prince of the Cherusci, triumphant after a victory over the Romans, brings back silver booty to his Druid priests

*After the painting by Hermann Prell*

**Druid Circle.** Name in popular usage for a prehistoric stone circle. One, vested in the National Trust, is near Keswick, Cumberland. Regarded by 18th century antiquarians as sites for Druidic worship, the exposed sepulchral dolmens often found with them were called Druid altars. Now recognized to be pre-Druidic, their subsequent adaptation for religious rites by the British priesthood of Caesar's day lacks definite proof. See Stonehenge; Stone Circles.

**Druids,** ANCIENT ORDER OF. Friendly society established on masonic principles and with masonic rites, and so called from an imagined imitation of the ancient Druids. The order was founded in London in 1781, and spread throughout England in independent but allied lodges. These lodges were later organized into groves and presided over by a Great Arch Druid. The order was introduced into the U.S.A. in 1883, where it spread rapidly.

**Drum.** Instrument of percussion, consisting of a hollow body over which a membrane is stretched. In primitive form the body was a gourd, shell, or earthenware vessel, struck often by the finger tips.

To-day the drums in use are of two main kinds: (1) Drums of cauldron shape, made of metal, with single head of vellum, used in the orchestra, and known as kettledrums (or Timpani). These are struck vertically by pairs of padded sticks, and produce notes of definite musical pitch. They were formerly used in pairs tuned to the tonic and dominant of the key of the music, but often three or more kettledrums are used in modern music, and they are given melodic as well as rhythmic passages. A pair of small kettledrums is used in cavalry bands.

(2) Drums of cylindrical shape, made usually of wood with two vellum heads. The pitch of these drums is indefinite. The smallest size, the shallow side drum with



**Druid Circle.** The circle near Keswick, Cumberland, about 100 ft. in diameter. It was vested in the National Trust in 1913



Drum. Examples of military and orchestral instruments. 1. Guards' bass drum. 2. Orchestral side-drum. 3. Military side-drum. 4. Guards' pattern side-drum. 5. Cavalry kettledrums. 6. Sticks for side-drum. 7. Sticks for bass drum

By courtesy of Hawkes & Son

metal sides, is played with hard wooden sticks, as is also the deeper military side-drum of wood. The largest is the bass drum, struck horizontally by heavy padded sticks. Of intermediate size is the tenor drum, used in bands of pipers. See Bagpipe: Cymbal.

**Drum.** In engineering, a cylinder, usually of cast iron or cast steel, mounted on a shaft and geared up to an engine, motor, or hand lever. A hoisting or hauling rope or chain is secured to the drum or may be given several turns round it. When the machinery is set in motion the drum, revolving, winds the rope around itself, paying out an equal length when the rope merely passes round it without being secured to it.

**Drumclog.** Hamlet of Lanarkshire, Scotland. It is 6 m. S.W. of Strathaven, near the border of Ayrshire, and was the scene of a victory of the Covenanters over the king's troops under Claverhouse (Viscount Dundee), on Sunday, June 1, 1679. A granite obelisk marks the site of the battle. Drumclog figures in Scott's *Old Mortality*. See Covenanters.

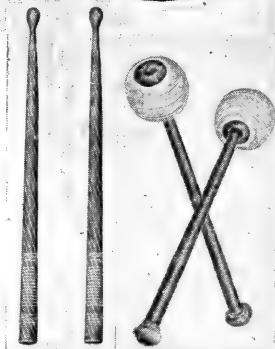
**Drum-Fire.** Expression for a rapid bombardment said by the German Staff account of the battles of Champagne to have been first used on the Champagne front in Feb., 1915. It is, however, much older, and occurs in Tolstoi's description of the Allies' bombardment of Sevastopol in Aug., 1855.

**Drum Language.** Method of communication by drum-signals, employed by primitive peoples. It has a possible range of 10 m. Across

Central Africa, from the Nile to Cameroons, it is in daily use for the exchange of news.

**Drumlanrig Castle.** Seat of the duke of Buccleuch in Dumfriesshire, Scotland. It stands on the Nith, 17 m. N.W. of Dumfries. It was built (1679-89) by the 1st duke of Queensberry, and suffered damage at the hands of Prince Charles Edward in 1745. In the grounds are the remains of Tibber's Castle, destroyed by Robert Bruce in 1311.

**Drumlin.** Arched, oval-shaped hills composed of till or boulder-clay usually containing rock fragments. They often attain a length exceeding a mile and a height of



from 100 ft. to 200 ft., and as they were formed below great ice sheets, they are common in glaciated regions, e.g. central Ireland, the Scottish lowlands, and the New England States (U.S.A.).



Drumclog. The battle on Drumclog Moor, Lanarkshire, in which the Covenanters defeated Graham of Claverhouse, June 1, 1679

Painting by Sir George Harvey, R.S.A.



**Drum Major.** Originally the principal drummer in a corps of infantry who "beat the best drum, had command over the other drums and taught them their duty." He is called the serjeant drummer. The ranks of drum major, trumpet major, and pipe major were abolished in 1881. See *illus.*, p. 968.

**Drummond, HENRY** (1786-1860). British banker and politician, one of the founders of the Irvingite or Catholic Apostolic Church. He was educated at Harrow and Christ Church, Oxford, became a partner in his father's bank, in 1810 was elected M.P. for Plympton Earls, and from 1847 till his death sat for W. Surrey. He founded the chair of political economy at Oxford, 1825. He died at Albury, Surrey, Feb. 20, 1860.

**Drummond, HENRY** (1851-1897). Scottish theological writer and scientist. Born at Glenelg,



Henry Drummond,  
Scottish theologian  
*LeFayette*

Stirling, Aug. 17, 1851, of an evangelical family, he was educated at Crieff; at Edinburgh, where he studied geology under Geikie, and at Tübingen. He was trained for the ministry at New College, Edinburgh, but did not adopt the title of minister. From 1873-75 he worked with D. L. Moody and I. D. Sankey, was appointed in 1877 lecturer on, and in 1884 professor of, natural science at the Free Church College, Glasgow. He held this appointment until his death, at Tunbridge Wells, March 11, 1897.

In the intervals of extensive travel he devoted himself to mission work, particularly among young men, and to the organization of the Boys' Brigade. His attempts to reconcile science and theology, as expressed in his *Natural Law in the Spiritual World*, 1883, and *The Lowell Lectures on the Ascent of Man*, 1894, are now regarded as heterodox, but with his *Tropical Africa*, 1888, and other works, these books enjoyed a large circulation in Europe and the U.S.A. See *Life*, George A. Smith, 1899.

**Drummond, JAMES** (1835-1918). British theologian. He was born at Dublin and was educated at Trinity College. In 1860 he became colleague to the Rev. W. Gaskell, husband of the authoress of *Cranford*, at Cross Street Chapel, Manchester, and in 1869 he was appointed professor of Biblical and Historical Theology at Manchester New College, London. He became

principal in 1885 in succession to Dr. James Martineau, and held this position until 1906. In 1889 the college was removed to Oxford. He was the author of many theological and expository works. He also wrote the *Life and Letters of James Martineau*, 1902, to which his colleague, C. B. Upton, contributed the section on Martineau's Philosophy. Drummond died at Oxford, June 13, 1918.

**Drummond, SIR JAMES ERIC** (b. 1876). British diplomatist. He was born Aug. 17, 1876, a younger son of the 14th earl of Perth, educated at Eton, and entered the Foreign Office in 1900, in 1906 being appointed private secretary to the under-secretary.



Sir J. Eric Drummond,  
British diplomatist

In 1912 he became private secretary to H. H. Asquith, then prime minister; but in 1915 he returned to the Foreign Office. Knighted in 1916, he became in 1919 the first secretary-general to the League of Nations.

**Drummond, THOMAS** (1797-1840). British engineer and administrator. Born in Edinburgh, Oct. 10, 1797, he was educated at the Edinburgh High School and at the Royal Military Academy, Woolwich, and in 1815 entered the Royal Engineers. Having obtained a post on the trigonometrical survey of Great Britain in 1820, he invented the "Drummond Light," a lime-light contrivance for long-distance surveying, and also an improved form of heliostat. From 1835-40 he was under-secretary for Ireland. He died at Dublin, April 15, 1840. See *Life and Letters*, R. B. O'Brien, 1889.

**Drummond, WILLIAM** (1585-1649). Scottish poet. He was born at Hawthornden, near Edinburgh, Dec. 13, 1585, the son of Sir John Drummond, and descendant of the mother of James I of Scotland. Educated in Edinburgh and France, he studied for the law, but on his father's death in 1610 settled down at Hawthornden to the companionship of his books, the pursuit of his hobby of mechanical invention, and his writings. His best work is in his sonnets, in which he followed closely Italian models. He invented the metre adopted by Milton for his *Hymn to the Nativity*. He was one of the first Scottish poets to write in pure English. The best example of his prose is *A Cypress Grove*, 1623, a meditation on death.

Scholar and Platonist, he was a sincere royalist. The outstanding incident of his life is the visit Ben Jonson paid to him in the winter of 1618-19, his *Notes* on which, published in 1842, have been the cause of much controversy. He died Dec. 4, 1649. In 1893 a memorial to him was erected at Lasswade, where he was buried. See *Life*, David Masson, 1873;



William Drummond,  
of Hawthornden  
*After Jansen*

Poetical Works and *A Cypress Grove*, ed. L. E. Kastner, 2 vols., 1913.

**Drummond Castle.** Scottish seat of the earl of Ancaster. The ancient home of the family of Drummond, it is in Strathearn, Perthshire, 2 m. S. of Crieff. Parts of it date from the 15th century.

**Drummond's Bank.** London bank. It was established in 1717 by a Scotsman, Andrew Drummond, who had settled in London as a goldsmith. It remained in the hands of the family until 1924, and from 1804 was known as Drummond & Co. It was absorbed in the Royal Bank of Scotland in Jan., 1924.

**Drummoynne.** Picturesque and rising suburb of Sydney, New South Wales. It is on the Parramatta river, 3½ m. from Sydney (*q.v.*). Pop. 8,678.

**Drunkard's Cloak, THE.** Instrument used in some parts of England during the 16th century for the punishment of drunkards. It consisted of a tub with holes in the sides for the arms to pass through, and was fitted on to the offender, who then had to walk through the streets as an object of public scorn.

**Drunkenness.** State of intoxication which in certain cases is an offence against the law. In English law, it is no excuse for crime. At the same time, when it is a question of *quo animo*, or with what intention a man did an act, he may escape because he may have been so drunk as to be incapable of forming any intention at all. Thus, a case of homicide may be manslaughter if committed by a man so drunk as not to know what he is doing, though the blow may be struck or the shot fired with apparent deliberation. If a man takes drink to nerve himself to commit a crime, he cannot escape the consequences by showing that he was so drunk as to have lost all intention. It is an offence to be drunk in a public place or a licensed house, or to be drunk and disorderly. An habitual drunkard

may be ordered to be confined in an inebriate's home by sentence of the magistrate. A person may voluntarily offer to go into such a home; and may then be compulsorily detained there. A contract made by a drunken man is voidable by him when he becomes sober; but only if the other party knew he was drunk when he made it. *See* Liquor Control; Prohibition; Temperance Movement.

**Drury, ALFRED.** British artist and sculptor. Born in London, he studied at the Oxford School of Art,



Alfred Drury,  
British artist

at S. Kensington, and under Dalou. He was first attracted to sculpture by the clay models of Chantrey's works in the Oxford University galleries. His first contribution to the Academy was the *Triumph of Silenus*, 1885; and in 1896 his bronze *S. Agnes* was bought for the Chantrey collection. He was elected A.R.A. in 1900, and R.A. in 1913. His other works include *The Age of Innocence*, 1897; *The Prophetess of Fate*, 1900; *King Edward VII*, 1903; and statues and decorative work at Leeds. His technique is best shown in ideal portraits of children.

**Drury Lane.** Thoroughfare and district in London, W.C., largely rebuilt in recent years. Extending from the modern crescent of Aldwych (*q.v.*) to Broad Street, S. Giles's, and High Holborn, the lane was originally known as the *Via de Aldwych*, after a Danish settlement in S. Clement's, which it linked with the hospital of S. Giles's monastery. Its present name derives from Drury Place, a mansion built in the 15th century by a member of the Drury family. In this mansion Essex and his followers planned the abortive rising of 1600. Rebuilt by William, earl of Craven, supposed husband of Elizabeth, the widowed queen of Bohemia and daughter of James I, the mansion was renamed Craven House, and on its site in 1805 Philip Astley built the Olympia Pavilion, later the Olympic Theatre.

On the W. side of Drury Lane, in Russell Street, is Drury Lane Theatre, with entrances in Russell Street and Catherine Street, and near by is the disused burial ground of S. Martin's, associated with Tom-All-Alone's of Dickens's novel, *Bleak House*. Near Holborn, on the E., is the Winter Garden Theatre, formerly *The Mogul*, and afterwards the Middlesex music hall. A serv-

ing man of the ancient inn near here, *The White Hart*, gave first warning of the outbreak of the plague which started in the vicinity in 1665. In the adjacent coal-yard was born Nell Gwynn, who later lived at a house in Drury Court, pulled down in 1891. Drury Lane was also the birthplace of Anne Clarges, afterwards duchess of Albemarle. On the E. side, S. of Great Queen Street, was Cockpit Alley, later Pit Place. A cockpit was here, as were the Cockpit and Phoenix theatres.

Once lined with hedgerows and houses of the nobility, Drury Lane became in the 18th century a place of ill repute, its mazy courts and dark abodes the theme of satiric reference by Gay, Steele, Pope, and others, while it was the scene of Hogarth's *Harlot's Progress*, *Lewknor's Lane*, renamed Charles Street, N. of Parker Street, being especially notorious. Of notable residents were the poet Donne, who found hospitality in Drury House; William Alexander, earl of Stirling; Elliston, when lessee of the Olympic; Thomas Campbell, in Vinegar Yard; Charles and Mary Lamb, in Russell Court; and the actresses Anne Bracegirdle, whom Lord

don playhouse. The first theatre on the site of the present building was erected in 1661, and opened April 8, 1663, by the King's Servants—one of Charles II's two companies of players—under Thomas Killigrew, with Beaumont and Fletcher's play, *The Humorous Lieutenant*. This theatre was burnt down in 1672. Sir Christopher Wren designed its successor, which was replaced in 1794 by a much larger edifice, also destroyed by fire in 1809.

Benjamin Wyatt was the architect of the 4th and present theatre, opened Oct. 12, 1812. It was on its boards that Edmund Kean achieved his first great triumph on Jan. 26, 1814, and there he appeared for the last time, March 12, 1833. Drury Lane won new prestige from Macready's brief management during 1842-43. It was here that he produced Browning's *The Blot on the Scutcheon*. Under the management of Augustus Harris, and afterwards of Arthur Collins, the huge building was associated with immensely popular pantomimes and spectacular melodramas, and here in 1917 Sir Thomas Beecham began a series of seasons of grand opera. The theatre was reconstructed and reorganized in 1921-22 and was opened on April 29, 1922, with *Decameron Nights*, a spectacular musical play.

**Druse** (Ger., decayed ore). Cavity in an igneous rock or ore-vein which is lined or studded with minute crystals. The Cornish miners call it a *vug*. This drusy condition may also appear on the surface of natural crystals. Beautiful crystals of quartz, beryl, topaz, tourmaline, garnet, and other minerals are frequently derived from granite druses. When globular nodules are hollow and drusy-lined they are called *geodes* (earth-like).

**Druses.** Syrian people inhabiting the W slope of Lebanon, anti-Lebanon and Hermon, and Hauran (Druz). Occupying some



Mohun attempted to abduct from her dwelling here, and Hannah Pritchard. *See* London; consult also *Old Time Aldwych and Kingsway*, C. Gordon, 1903; illus. of Craven House, in *Londoniana*, vol. iv, E. W. Brayley, 1829.

**Drury Lane Theatre.** Lon-



Drury Lane Theatre. Main entrance in Catherine Street. Above, frontage of the old theatre in 1778





**Druses.** Women of the Syrian people from the Lebanon district, wearing their characteristic costume

100 towns and villages and scattered elsewhere amongst other races, their total number is estimated to be from 100,000-200,000. They are probably an admixture of different stocks, with a preponderating Arab element, the language spoken by them being Arabic. Others regard them as Iranians. They are under sheikhs or village headmen, themselves subordinate to ameers, both, together with the landed proprietors, forming a kind of supreme council. The vine, olive, and tobacco plant are cultivated, and silkworms reared.

Their religion is a curious mixture of Mahomedanism, Judaism, and Christianity, but they pride themselves on being Muwahiddin, believers in one god. This one god is said to have manifested himself ten times in the flesh, the last time in the person of Hakim, the Fatimite caliph of Egypt (996-1021), who is expected to reappear as the Messiah. From his disciple and supporter Darazi, the name Druses is supposed to be derived. The people are divided into Akils (learned), who alone possess knowledge of the sacred books and mysteries; and Jahils (ignorant). They believe in the transmigration of souls, the soul passing from one body to another until it finally becomes perfect.

Forced to submit to Murad III in 1588, under their chief Fakred-din in the early 17th century the Druses enjoyed their greatest prosperity. Beshir (c. 1786) kept himself in power by offering his services to various rebels, being finally obliged to quit the country when the Porte reconquered Syria

in 1840. The adoption of Maronite Christianity by another Beshir led to civil war. Druses and Maronites were put under a separate kaimakan or governor, but after the Damascus massacre of Christians in 1860, the Lebanon district was placed under a Christian governor. Turkish misrule led to fresh disturbances in 1895-96, which, as the Turks made some concessions, were followed by a period of comparative quiet. See La Nation

Druse, H. Guys, 1863; Arab and Druze at Home, W. Ewing, 1907; The Druses, E. Sell, 1910. *Proton Drootz.*

**Drusilla**, LIVIA (d. A.D. 29). Wife of the Roman emperor Augustus. She was previously the wife of Tiberius Claudius Nero, whom Augustus compelled to divorce her. Her elder son by the first marriage became the Roman emperor Tiberius, while her second son, with whom she was pregnant at the time of the divorce, was Drusus. She is not to be confounded with Drusilla, wife of Felix, procurator of Judaea before whom S. Paul preached; nor with the daughter of Germanicus.

**Drusus**, MARCUS LIVIUS. Colleague of Gaius Gracchus in the tribuneship, 122 B.C. Won over by the senate, he vetoed the bills brought forward by Gracchus and brought forward others making far greater concessions, in order to secure popular favour. His son, of the same name, tribune in 91, made various proposals dealing with the distribution of public lands and rearrangement of the jury-courts. Having aroused suspicion by suggesting that the franchise should be extended to the Italians, he was assassinated.

**Drusus**, NERO CLAUDIUS (38-9 B.C.). Roman soldier. Son of Livia Drusilla by her first husband, Tiberius Claudius Nero. Her second husband, the emperor Augustus, conceived a great liking for Drusus, who became one of his most distinguished generals, and conducted a campaign in Germany which extended the Roman dominion to the Elbe. He was the father of

the emperor Claudius. This Drusus was called Senior, to distinguish him from his nephew, the son of Tiberius, who was poisoned at the instance of Sejanus (q.v.).

**Dryads** (Gr. *drys*, oak). In Greek mythology, nymphs associated with trees. A dryad was supposed to live only as long as the particular tree with which she was associated. See Nymph.

**Dryas** (*Dryas octopetala*). Perennial dwarf shrub of the natural order Rosaceae. It is a native of Europe, Asia, and N. America. The short stem is embedded in the soil, and the numerous spreading and closely packed branches lie along the surface, bearing many tufts of oblong, toothed, evergreen leaves. The white flowers are 1½ in. across, and the fruits are provided with long, feathery awns.

**Dryburgh Abbey.** Monastic ruin in Berwickshire, Scotland, on the Tweed, 4½ m. S.E. of Melrose. Generally stated to have been founded in 1150, it suffered at the hands of Edward II in 1322, was partially destroyed by Richard II in 1385, and almost totally demolished by the earl of Hertford in 1544. After the Reformation the property, no longer put to religious uses, passed to the earl of Mar. The existing remains include the chapter house, parts of the large and beautiful church, and traces of the monastic buildings. Sir Walter Scott and several of his relatives are buried in S. Mary's aisle. In 1918 it was presented to the nation by Lord Glenconner.



**Dryburgh Abbey.** S. Mary's aisle, containing the tomb of Sir Walter Scott



**Nero Claudius Drusus.** Roman soldier. From a bust in British Museum

**Dry Cell.** In electricity, a type of cell in which the solution is converted practically into a solid by the addition of chemicals of gelatinous materials which vary according to the type of cell. The advantages of dry batteries are portability and cleanliness. See Cell, Voltaic.

**Dryden, JOHN** (1631-1700). English poet. Born at Aldwinkle, Northamptonshire, Aug. 9, 1631, he was educated at Westminster and Trinity College, Cambridge. Being possessed of a competence from his father's estate, he decided upon a literary career, and, to satisfy popular taste, he began to write plays, continuing to do so, chiefly for financial reasons, all the rest of his life. He wrote twenty-two in all, but he had no real gift for dramatic composition, and apart from certain isolated passages, Dryden's plays add nothing to his reputation. The best known are perhaps *The Indian Emperor*, 1665; *The Conquest of Granada*, 1670; and *Marriage à la Mode*, 1672. The plays are tainted with the licentiousness which characterises the Restoration drama.

Dryden's career in poetry proper began in 1659, when he published some verses on the death of Cromwell. A subsequent effort in 1660, *Astraea Redux*, a poem on the restoration of the monarchy, has laid Dryden open to the charge of trimming, but panegyric prompted by the passing of a great man is not necessarily inconsistent with an expression of welcome towards a new order of things after the gloomy years of Puritan rule. A much finer effort is the *Annus Mirabilis*, 1667, a poem on the wonderful year of 1666 which saw the end of the Great Plague of London, the Great Fire, and the Dutch War. A long period of writing for the stage ensued, and it was not until 1681 and 1682 that Dryden published his three great satires *Absalom* and *Achitophel*, *The Medal*, and *MacFlecknoe*. The first is an attack upon Lord Shaftesbury. He is Achitophel counselling the young duke of Monmouth, who is Absalom, to rebellion against his father. When Shaftesbury was tried for high treason and acquitted, his friends had a medal struck to celebrate the occasion. This provoked from Dryden the second satirical poem, considerably inferior to the first. The rival partisans engaged the minor poet Shadwell to reply in kind. Shadwell's effort was so vulgar and scurrilous that it provoked yet a third poem from Dryden entitled *MacFlecknoe*—from the name of

an obscure Irish bard—a masterpiece of subtle satire, which completely overwhelmed the unfortunate Shadwell.

Dryden's next poems, *Religio Laici*, 1682, and *The Hind and the Panther*, 1687, show him in quite a new light. The first appears to have been written in defence of the Church of England, while the second is in defence of the Church of Rome, to which he had in the meantime become a convert. The "milk-white hind immortal and unchanged" is the latter, while the spotted panther is the former. During the closing period of Dryden's life appeared his two noble odes, the *Ode for St. Cecilia's Day*, 1687, and *Alexander's Feast*, 1697; several verse translations of classical poets, and a number of miscellaneous writings, including a paraphrase of some of Chaucer's *Canterbury Tales*.



*John Dryden*

After Kneller

Up to the revolution of 1688 Dryden had enjoyed some degree of prosperity, having been made Poet Laureate in succession to Davenant, and receiving several other government appointments. Quite early in life he had married Lady Elizabeth Howard, daughter of the duke of Berkshire. The advent of William III deprived him of his laureateship and other offices. He died May 1, 1700, and was buried in Westminster Abbey.

There are echoes of the Elizabethans in the poetry of Dryden, but he belongs essentially to the classical school of poetry, which in the matter of form, at any rate, was brought to its highest point of

perfection by Pope in the next century. Less polished than Pope, Dryden has much more vigour in his poetry. The same quality of vigour is shown in the admirable prose of the prefaces to his plays. See *English Literature*.

John McBain

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**Dry Farming.** Special method of growing crops. In regions where the annual rainfall is under 20 ins., such as large tracts of Africa, Australia, and North America, they cannot be successfully grown on ordinary lines. To deal with such cases dry farming has been introduced. The essential feature is summer-tillage every other year, or once in three years, so as to store up moisture in the soil for the use of the crops that follow. Disk-harrowing, followed by deep ploughing and again by pressing with fluted rollers, removes all moisture-stealing weeds and produces a finely divided surface layer of "mulch," which checks evaporation and conserves the water in the soil. Most cereals do well, but barley, being shallow-rooted, is not to be recommended. See *Agriculture*; *Crops*.

**Drygalski.** Islet in Davis Sea, Antarctica. Off the coast of Queen Mary Land, it is about 9 m. in diameter. It was discovered and named by Sir Douglas Mawson, of the Australasian Antarctic Expedition, Jan. 21, 1914.

**Drygill Shales.** Group of sedimentary rocks on Caldbeck Fell, Cumberland. Like the Dufton shales on the W. Pennine slope in Westmorland, they represent isolated residual outcrops of strata deposited in late Ordovician time, when the Sliddale group of Conistone limestones was being laid down farther S. over the Lake district.

**Drying Machine.** Apparatus for removing moisture from textile materials. Excess moisture is removed from loose textile materials by centrifugal dryers, and also by squeezing rollers and afterwards passing the material through hot-air chambers upon conveyers. Cloth may be semi-dried by suction in passing over a cylinder, and further dried by transit over steam-heated cylinders. Drying cylinders for textile fabrics are arranged horizontally or vertically at will, and the speed of driving is adjusted to suit requirements. See *Woolen*.

**Dry Point.** Process of etching. It is closely akin to line engraving, in the preliminary stages of which it was often used, especially in outlining the general disposition of a subject. The tool is a steel rod tapering at one or both ends to a strong, fine, sharp point. With this the etcher draws with a firm hand, the point scratching a line of exquisite sensitiveness on the copper plate, and raising, as it goes along, a very distinct burr on the sides of the furrow, which lends particular value to early prints from the plate.

**Dryptosaur** (Gr. *dryptein*, to tear; *sauros*, lizard). Extinct N. American reptile of the genus *Dryptosaurus*, alternatively called *Laelaps*. It was a carnivorous, beast-footed dinosaur, living in Montana in Upper Cretaceous times, and allied to the English megalosaur. It was 20 ft. long, rapacious and sharp-toothed; it used the hind limbs and tail in kangaroo fashion. See Dinosaur.

**Dry Rot.** Diseased condition of timber due to the ravages of certain species of fungi, especially *Merulius lacchrymans*. This fungus rapidly consumes the woody cells and fibres, the affected parts crumbling to a brownish powder upon exposure to a dry atmosphere. A certain degree of moisture is essential to the growth of the fungus, and is visible where it spreads its lace-like film over wood confined within a damp and stagnant atmosphere. The popular term serves to distinguish this condition from wet rot, a kind of putrefaction occurring in wood exposed to the weather.

A single plant of *Merulius lacchrymans* puts forth millions of reproductive spores, which, being of microscopic size, may be borne about by the air, or conveyed imperceptibly from infected to sound timber by a saw; or the disease may be propagated by the dispersion of infected sawdust, or by the creeping of the fungus from one piece of timber to another, even when the pieces are separated by some material from which the fungus can derive no sustenance, but which it will use as a bridge, such as brick or stone. The common idea that the fungus eats away the interior of beams which outwardly appear sound is probably erroneous. Thus, in the old roof of Westminster Hall some of the beams and rafters were hollowed to mere shells, but it was found that the damage was due to a boring beetle. Dry rot, it is believed, cannot develop (though it may long remain latent) in wood to which air-currents have free access, and from which moisture is excluded.

Conformably to this assumption, architects and builders are legally required to provide effective ventilation and otherwise prevent dampness by inserting damp-proof courses, concreting foundations, and forming dry areas (see Brick-work; Building). Steeping the wood in corrosive sublimate has been recommended as an additional precaution against dry rot. The dry rot of oak-built ships is usually due to another species of fungus, *Poria hybrida*.

**Drysaltery.** Term applied to the business of a drysalter or the articles sold by him. These consist of heavy chemicals (borax, salt, soda, sulphur, etc.), dye-stuffs (alkaneet, indigo, etc.), gums (arabic, shellac, kauri, resin), oils (paraffin, linseed oil, boiled oil, turpentine), and crude drugs (linseed, senna, Epsom salt, Glauber's salt, etc.). Drysalters also sell pickles, preserved meat, and sauces.

**D.S.C.** Abbrev. for Distinguished Service Cross (*q.v.*) (formerly Conspicuous Service Cross).

**D.Sc.** Abbreviation for Doctor of Science.

**D.S.M.** Abbrev. for Distinguished Service Medal (*q.v.*).

**D.S.O.** Abbreviation for companion of the Distinguished Service Order (*q.v.*).

**Dual.** Grammatical form originally used in some languages to express the idea of things naturally thought of in pairs, as the eyes and feet. It was then extended to other objects associated in twos (two men, two books). It is found in Sanskrit, ancient Greek, Arabic, and Hebrew, and traces of it occur in Anglo-Saxon.

**Duala.** Town and district of Cameroons, W. Africa. The town is situated on the Cameroons river about 18 m. from the sea, and is the chief seaport of Cameroons. Duala proper, i.e. the port and European quarters, occupies the site of the former Bell Town. Akwa is a large native centre and Dido the residential quarter for the native clerks and workmen employed at the port. These three towns, known collectively as Duala, represented the headquarters of the three native chiefs at the time of the German occupation in 1884.

Duala occupies a position of great importance with respect to maritime trade in W. Africa. The Northern Rly. runs from Bonaberi, opposite Duala, northward, and will eventually be prolonged to a point on the Shari river, probably Fort Lamy. The Midland Rly. leaves Duala in a southerly direction and runs to the Njong river, whence it will be continued to Wesso, on the navigable Sanga

tributary of the Congo, in the one direction, and to Bangui, on the Ubangi river, in the other. Duala will thus become the main outlet for French Equatorial Africa and the Lake Chad region. There is an extensive trade in palm oil and palm kernels, cocoa, and rubber. Duala is now in the French sphere. It was captured by a combined British and French force on Sept. 27, 1914. Pop. of district, 77,000, and of town 22,000. See Cameroons, Conquest of; also *illus.* p. 1612.

**Dual Control.** Any system of controls for engine and aeroplane, whereby either the pilot or passenger can operate them. It is principally employed in the instruction of pupils. Two sets of rudder and control levers are installed, and these are interconnected so that the instructor can correct the faults of the pupil. See Airmanship.

**Dual Ignition.** Arrangement by which two forms of ignition apparatus are fitted to an engine. One system is by accumulator and coil for starting purposes, and by magneto for the subsequent operation. The term is sometimes applied to the system of fitting two sparking plugs to the engine cylinder in order to produce two sparks simultaneously and thus facilitate the ignition of the explosive mixture.

**Dualism** (Lat. *dualis*, containing two). The assumption of two principles, as opposed to monism, the assumption of one. It may be applied to man (anthropological), to God (theological), to the world and existence (cosmological, metaphysical). Anthropological dualism regards man's body and soul as two distinct existences; theological dualism assumes two first principles, a good and a bad, eternally in conflict; cosmological dualism lays down two original substances or entities, mind and matter, thinking substance and extended substance, of which everything is composed.

In the ancient philosophies dualism appeared as the opposition of matter and form, later as a contest between objectivity and subjectivity, the last attempt to reconcile them being that of neo-Platonism. Descartes was the first of modern philosophers to substitute for this the dualism of mind and matter, and from his time the question how their relation to each other as manifested in experience is to be interpreted has engaged the attention of thinkers without any satisfactory or generally accepted explanation being reached. The reaction against idealism, which amounted to an abolition of dualism, has led to the reassertion of the latter by some philosophical writers.

**Dual Monarchy.** Name given to the empire of Austria-Hungary. Formed in 1867 by the union of Austria and Hungary, for half a century the two countries were joined under the same ruler, emperor of Austria and king of Hungary. As a result of the Great War they became separate republics. See Austria-Hungary: Czecho-Slovakia.

**Duars.** Submontane tract of N. India. The land at the foot of the Himalayas is known as the tarai or terai; it is largely jungle forest, inhabited by wild beasts, and has heavy monsoon rains. Portions of the luxurious vegetation have been cleared for tea plantations, paddy fields, and jute and tobacco crops. The width of the duars is about 25 m., and the total area 3,500 sq. m. Pop. 120,000.

**Dubail, AUGUSTIN YVON EDMOND** (b. 1851). French soldier. Born at Belfort, April 15, 1851, he



Augustin Dubail,  
French soldier

became a lieutenant in infantry in the French army in 1870, and served in the Franco-Prussian War. For ten years he was chief of staff of the Algerian Division and colonel of the 1st Zouave Regiment in Algeria. On his return to France, after holding various appointments, he became chief of staff of the French army, commander of the 9th Army Corps, and a member of the superior council of war. On the outbreak of the Great War Dubail was given the command of the French First Army operating in Alsace and Lorraine, successfully defended Nancy, and afterwards held up the Germans on the Heights of the Meuse. In April, 1916, he was appointed military governor of Paris, and held that position till June, 1918.

**Dubawnt.** River and lake of the N.W. Territories, Canada. The river rises from Wholdaia Lake, almost on the border of Saskatchewan, and flows almost due N.N.E. to Dubawnt Lake. Issuing from this, it bends round to the N. again and then turns E. until it falls into Chesterfield Inlet, in Hudson Bay. Its length is about 580 m. The lake is really an extension of the river and is about 1,650 sq. m. in extent. Other lakes on the course are Aberdeen and Baker. The river's main tributary is the Thelon, which joins it as it turns E. It was discovered in 1770. The Dubawnt Basin forms part of

the Barren Grounds, almost treeless and frequently frostbound, even during certain summers.

**Dubbin.** Dressing applied to leather to soften it and render it waterproof. It is composed of Russian tallow softened with cod-liver oil and is especially employed for waterproofing heavy boots.

**Dubbo.** Town of New South Wales. It stands on the Macquarie river, 278 m. by rly. N.W. of Sydney, and is the trade centre of a vast pastoral and coal and copper mining area. Pop. 5,389.

**Dubica.** Town of Yugo-Slavia. It is situated on both banks of the Una, one portion being in Croatia and the other in Bosnia. The

7,330, almost equally divided between Roman Catholic Croats and Greek Orthodox Serbs; Bosnian portion, 3,500, three-quarters Mahomedans.

**Dubissa.** River of Russia. It joins the Niemen W. of Kovno, in the govt. of that name. It came into prominence in 1915 during the fighting between the Russians and Germans when the latter attempted to overrun the Baltic provinces. After heavy fighting (May-July) along the river line, on July 20 the Germans broke through the Russian positions. See Courland.

**Dublin.** Eastern maritime county of Ireland, in the prov. of Leinster, with about 72 m. of coast-line including indentations. Dublin Bay is the largest inlet, the Liffey, which debouches into it, the chief river, and Howth Head the most prominent cape. Lambay and several smaller islands near the coast are included in the county. Mountains occur in the S. (Kippure, 2,473 ft.), but the surface is generally a gently undulating plain, almost entirely under cultivation, wheat, oats, barley, and potatoes being the chief crops raised; the N. and W. parts contain much pasture land. Mineral products include lead and copper ores, and granite; fishing is a thriving industry, and the leading manufactures are whisky, beer, and hosiery. The G.S. and W., M.G.W., G.N.I., L. & N.W., and the D. & S.E. Rlys. afford communication. Dublin (county town) and Kingstown are the most important towns. Formerly it returned 4 members to Parliament. Its area is 342 sq. m. Pop. exclusive of Dublin city, 172,394.



Dublin. Map of this maritime county of Ireland, in the province of Leinster

Croatian town is served by the main line of rly. from Zagreb to Belgrade. Pop. Croatian portion,

## DUBLIN: CAPITAL OF IRISH FREE STATE

Arthur W. Garbutt, of *The Irish Times*

*In addition to the following article there are articles on all the Irish cities and towns; also on the Liffey; Phoenix Park, etc. See also, for the events of 1916-20, Ireland: History; Sinn Féin*

The city of Dublin is a seaport, county, and parl. borough in the prov. of Leinster. It is situated on Dublin Bay, at the mouth of the Liffey, 61 m. W. of Holyhead. Enclosed by the Circular Road, 9 m. in circuit, the city is divided into two nearly equal parts—N. and S.—by the Liffey, which is spanned by 12 bridges.

Dublin may be the Eblana of Ptolemy. The name means Black Pool (Dubh-Linn), suggested by the pool at the confluence of the tribu-

tary Poddle with the Liffey, which otherwise spread over marshy land. A track made of hurdles across the marshes gave the place its older name of Ath Cliath. The Poddle is now a sewer under Dublin's oldest streets, but the place of its outflow to the Liffey was the site of the oldest elements of the city, and the Custom House stood there till the close of the 18th century. In this area are Christchurch Cathedral, founded in 1038 and established as a cathedral in 1541, and S. Patrick's Cathedral, founded in 1190 and restored in 1865 at the expense of Sir B. L. Guinness. Both are in the hands of the Protestants; the Roman Catholics, though



Dublin city  
arms



Dublin. 1. Bank of Ireland, the Houses of Parliament, until the Union of 1800. 2. Viceregal Lodge, Phoenix Park, formerly the residence of the Viceroy. 3. Four Courts, King's Inn Quay, before the bombardment of 1922. 4. S. Patrick's Cathedral from the N.E. 5. Custom House, before destruction by fire, 1921. 6. College Green : left, the Bank of Ireland ; facing, Trinity College. 7. Sackville Street, looking towards the Nelson Pillar

numerically the larger element, have so far only a pro-cathedral.

Near S. Patrick's cathedral, which includes memorials of Stella and of Dean Swift, who was born in Hoey's Court, is a district formerly inhabited by a colony of weavers and their descendants, who carried on a once important industry. Of present industrial importance are the breweries and distilleries—notably Guinness's—in this S.W. quarter of the city. From the centre at College Green, going S. by Grafton Street—the Bond Street of Dublin—Stephen's Green, a well laid-out public park, is reached, and beyond it are the suburbs of Rathmines, Rathgar, Ranelagh, and Donnybrook. Northwards from College Green, another radial cuts the Liffey at O'Connell Bridge, and is continued along a broad thoroughfare well known as Sackville or O'Connell Street, which is being handsomely restored after the destruction caused in the insurrection of 1916. Eastwards, on both sides of the Liffey, run the lines of quays; there are also docks and ship building yards of rapidly increasing importance.

The harbour is protected by two large breakwaters, and great im-

provements have been effected in recent years. The Dublin Port and Docks Board, created in 1898, exercises control over the port. The Grand Canal Docks lie on the S. side of the river. The handsome Custom House, destroyed by fire by Sinn Feiners in 1921, was on one of the northern quays. Westwards from O'Connell Bridge are the Four Courts Buildings, much damaged in 1922; and further up the Liffey, on its N. bank, is the main gate of Phoenix Park, in which are situated the viceregal lodge, the lodge formerly occupied by the chief secretary, former headquarters of the R.I.C., an infirmary, the zoological gardens, and a fine polo-ground. The park, 1,750 acres in extent, was the scene in 1882 of the assassination of Cavendish and Burke.

The shipment of live stock is one of the chief activities of Dublin port. Other industries not already mentioned are biscuit-making and the preparation of artificial manures and fertilisers. With government departments, the judiciary, the two chief universities, and national organizations of all kinds centred in Dublin, the civil service and professional element is at least

as important as the commercial. In May 1924 the Dublin corporation was dissolved by the Irish Free State ministry for local government, and its powers transferred to three commissioners: its duties were not being effectually discharged. The municipal council consisted of 80 members, one alderman and three councillors to each of 20 wards. The corporation had, however, to deal with the old, overcrowded city area, expensive to administer without assistance from the newer and more easily administered suburbs, which have preferred to remain independent, though their inhabitants, for the most part, make their living in the city. The valuation on March 1, 1919, was £1,136,519. The electricity supply is municipal, but not the gas; the corporation controlled an excellent water supply for Dublin and its dependent areas, but the tramway service is an independent enterprise.

Dublin has many educational and artistic institutions. The chief of these are Dublin University or Trinity College, Dublin, and the National University, virtually a Roman Catholic university. The former has a well-known medical



school, and there are also the Royal College of Physicians and the Royal College of Surgeons of Ireland, both examining and to some extent teaching bodies. The National Gallery of Art and National Portrait Gallery has acquired a fairly good collection, considering the lateness of its start. To the energy and brilliant ventures of the late Sir Hugh Lane was due the assembly of a unique modern art collection as a municipal gallery, which contains a number of representative works by modern and contemporary artists, British, Irish, and foreign.

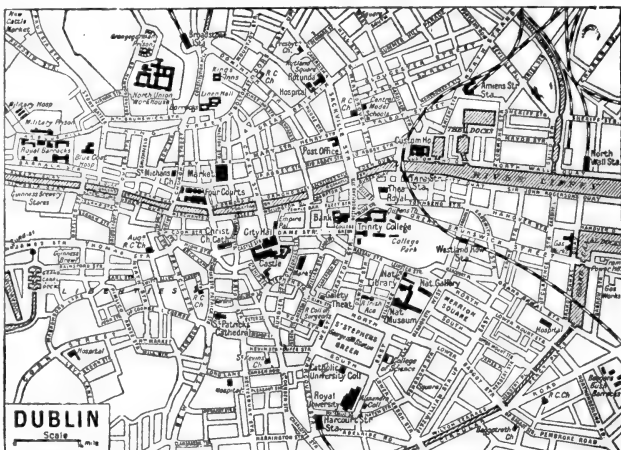
Dublin has long taken a lively interest in music and the drama, as befitted the birthplace of Balfe and Sheridan and the scene of the first production of *The Messiah* under Handel's personal direction. Its Abbey Theatre (*q.v.*) was the home of a significant modern movement in drama, and is still conducted on repertory lines. The Royal Irish Academy of Music maintains a high standard of musical teaching.

#### Dublin Horse Show

The Royal Dublin Society, which has a noble home in the former town house of the dukes of Leinster, includes music among its varied subjects; other subjects are scientific research, the improvement of Irish horse- and stock-breeding and agriculture in Ireland generally. It holds the annual Dublin Horse Show, famous for the display of hunters and for the brilliant social season associated with it in August. The Royal Irish Academy, which has a commodious Academy House next to the Mansion House, while generally promoting the humanities, specially favours archaeological and antiquarian studies. There are four morning and three evening daily papers, and numerous periodicals. An Irish Republican parliament, consisting of Sinn Féin members who were elected by Irish constituencies at the general election of Nov., 1918, but did not attend the Imperial parliament at Westminster, held several sessions at the Mansion House in 1919-20.

Rly. facilities are adequate, the city being served by several lines, and communication with the Shannon is effected by the Royal and Grand canals. A regular steamboat service is maintained with the principal ports of Great Britain. The annual value of exports amounts to £3,000,000, and the imports to £150,000. The celebrated Dublin horse and cattle shows are held at Ball's Bridge. Market days, Tues., Wed., and Fri. Pop. 304,802.

**HISTORY.** Dublin begins its history as a Scandinavian settlement, a base, often hardly main-



Dublin. Plan of the capital of the Irish Free State, showing the situation of the Castle and other principal buildings

tained against the assaults of the native Irish and their allies, for the Norse rovers. A dist. of old Dublin is still called Oxmantown, from Ostmen-town, the invaders being called Ostmen. Between the Norse settlers and foragers and various Irish chieftains and tribes a bitter and alternating conflict was waged for centuries, and the battle of Clontarf, fought on the N. side of the city in 1014, was the bloodiest of a long series of encounters. In 1170 the Anglo-Norman adventurers under Strongbow came, and for long thereafter Dublin was the capital of the English Pale. Henry II granted the city to his "subjects of Bristol" in 1173, 500 of whom were massacred at Cullens Wood on Easter (Black) Monday, 1209. Dublin suffered greatly during the Civil War, and in 1647 was surrendered by the duke of Ormonde, who two years later was defeated at the battle of Rathmines. James II held a parliament here in 1689. The chief events of more recent times were the rebellions of 1798 and 1803, the Sinn Féin revolt of 1916, and the battle of July, 1922.

#### The Irish Parliament

The title of lord mayor was given to the city's chief magistrate by Charles II in 1665. In 1729 the building of the houses of parliament for the Irish parliament was commenced, and the period of the Irish parliament was a brilliant one for Dublin. It ended in 1800 with the Act of Union. There was a serious rising in Dublin at Easter, 1916, and further trouble there during the disorders of 1919-22.

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Story of Dublin, D. A. Chart, 1907; Dublin, S. A. O. Fitzpatrick, 1907; Disturbed Dublin: story of the general strike, 1913-14, A. Wright, 1914.

**Dublin Bay.** Inlet of the Irish Sea. It penetrates the E. coast of Ireland as far as Dublin, a depth of about 10 m., and from its entrance at Howth peninsula on the N. to Kingstown on the S. is 6 m. Owing to its difficult navigation numerous lighthouses have been erected along its shores. The Liffey is the principal river discharging into the bay. The Hill of Howth at its N. end (562 ft.) and Killiney Hill at its S. (480 ft.) form conspicuous landmarks at the entrance. Its depth varies from 2½ to 10 fathoms.

**Dublin and South-Eastern Railway.** Irish rly. from Dublin to Waterford. It has a total mileage of 218, and its headquarters and works are in Dublin, where it owns Westland Row station. The line was opened in 1856, and took over an older one, the Dublin and Kingstown. Until 1907 it was known as the Dublin, Wicklow, and Wexford Rly. It has a capital of £2,500,000 and owns two hotels.

**Dublin Fusiliers, Royal.** Former regiment of the British army. It originated in the early days of the



Royal Dublin Fusiliers badge

British rule in India. In 1662 a regiment was raised in England for the defence of Bombay, and was soon taken into the service of the East India Company. In 1748 another was formed to serve at Madras, and the two were known as the

**Bombay and Madras Fusiliers.** They fought at Plassey, Wandewash, Seringapatam, Nundydroog, and elsewhere, went to Aden and Burma, and took part in Mahratta and Sikh campaigns. In the Indian Mutiny they marched under Havelock to the relief of Lucknow, and when the East India Company ceased to exist became regiments of the British army, the 102nd and 103rd. In 1881 the two were united as the Royal Dublin Fusiliers.

The regiment rendered conspicuous service in the S. African War. In the Great War the 2nd batt. was in the Mons retreat, and the 1st shared in the landing in Gallipoli, April 25, 1915. The 6th and 7th Dublin Fusiliers, part of the 29th brigade of a new Irish division raised by Kitchener, took part in the Gallipoli operations. The 8th and 9th fought in the battle of the Somme, and the 10th helped the naval men in the attack along the Ancre, Nov., 1916. It was disbanded in 1922.

**Dublin Society, Royal.** Irish learned society. It was founded in 1684 as the Dublin Philosophical Society, on the model of the Royal Society of London, Sir William Petty being the first president. It obtained a botanic garden, a museum, and a laboratory, but came to an end in 1687. In 1693 it was refounded, and Trinity College became its home. This society, too, failed to last, and in 1731 was succeeded by the Dublin Society for improving husbandry, manufactures, and other useful arts. In 1750 this was incorporated as the Royal Dublin Society, and, aided by grants of public money, did much for Irish industries and art. It has published its Transactions and Proceedings, and issues a journal. The headquarters are at Leinster House, Kildare Street, Dublin.

**Dublin University.** Irish university, consisting of Trinity College, Dublin. Founded in 1591, it has always been the educational headquarters of Protestant Ireland, and its religious tests were only abolished in 1873. It is governed by a chancellor, senate, and council; the executive head is the provost. There are senior fellows, junior fellows, and scholars, and its courses resemble those at Oxford and Cambridge, with which Trinity is closely connected. Undergraduates, as a general rule, must reside for a certain period in college, or in the vicinity. The normal course is four years; those therein being known as junior freshmen, senior freshmen, junior sophisters, and senior sophisters. The buildings, which

are entered from College Green, are very extensive. Parliament Square contains the chapel, dining-hall, and examination hall, while in Library Square is the library with a priceless collection of manuscripts.

Among the modern buildings are the museum, and those for the medical school. Around is the college park, while at Dunsink is the university observatory. The college has also various museums and laboratories, as well as botanic gardens. Women have been eligible for the degrees since 1903, and for them there is residential accommodation in Trinity Hall. Goldsmith, Burke, and Berkeley, as well as the great Irish orators and statesmen, were here. In the 19th century may be mentioned Lecky, Dowden, Mahaffy, and Bury. There is also in Dublin another university, the National University of Ireland, a Roman Catholic institution.

**Dubno.** Town of Ukraina, in the govt. of Volhynia. It stands on the Ikva, 32 m. W. of Ostrog. The inhabitants, chiefly Jews, are engaged in tanning, brick-making, and tobacco manufacture. At the two yearly fairs much trade is done in grain, cattle, wool, and tobacco. In the Middle Ages, Dubno assemblies of the Polish nobility were held there. Pop. 14,000.

**Dubno, BATTLES OF.** Fought between the Russians and Austro-Germans, 1915-16. The first phase was the campaign of Aug.-Sept., 1915, leading up to the capture of Dubno by the Austrians. After the fall of Kovno and Brest-Litovsk in 1915, Gen. Evert's line formed a large salient on the Russian front, and Hindenburg designed to concentrate an immense force to envelop the Russian armies.

The great blow for Dubno was launched towards the end of Aug. along the front from the Dniester to the S. fringe of the Pripet, with the result that Dubno, Brody, and Lusk, and the line of the Strypa river, fell to the Austrians. The Russians' counter-attacks in Sept. and Oct. proved unsuccessful, and Dubno remained in Austrian hands.

The second battle, June-July, 1916, culminated in the recapture of Dubno by the Russians. The Russians, under Brusiloff, began their great offensive against the Austro-Germans on the S. part of the E. front on June 4, 1916, attacking on the whole front from the Pripet to the Pruth, but making progress mainly in Volhynia and in the Bukovina.

The Austrians, with considerable German supports, made a determined effort to prevent the Russians from crossing the Ikva,

but after a swaying battle lasting four days the Russians captured Dubno on June 9.

**Dubois.** Borough of Pennsylvania, U.S.A., in Clearfield co. It is 78 m. direct and 129 m. by rly. N.E. of Pittsburg, and is served by the Pennsylvania and other rlys. A busy trading centre for coal worked in the locality, it has ironworks, blast furnaces, railway repair shops, and glass factories. Settled in 1873, it was incorporated in 1881. Pop. 14,010.

**Dubois, CLÉMENT FRANÇOIS THÉODORE** (1837-1924). French composer. Born at Rosnay, Marne, Aug. 24, 1837, he studied music at the Paris Conservatoire, where he became a professor in 1871, and was its director from 1896-1905. He was organist of the Madeleine, 1875-96. Dubois's compositions include operas and oratorios. He died June 11, 1924.

**Dubois, GUILLAUME** (1656-1723). French statesman and cardinal. Born at Brive, Limousin, Sept. 6, 1656, he was educated by the monks in his native town, and entered their order. He completed his education at Paris, where a friend, Antoine Faure, secured for him the post of tutor to the prince, who became the regent, Philip of Orleans. Dubois showed a taste for political intrigue, and after 1715, when Philip became regent, was his chief counsellor.

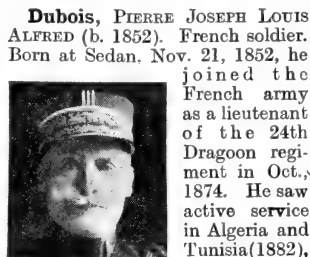
The great work of the priest was to reverse the traditional policy of Louis XIV. He was strongly hostile to Spain, and brought about an alliance between France and Great Britain and Holland. Dubois secured the archbishopric of Cambrai, and was made a cardinal in 1721. He remained chief minister when Louis XV came of age, but almost at once died at Versailles, Aug. 10, 1723. See *Memoirs of Cardinal Dubois*, P. Lacroix, Eng. trans. E. Dowson, 1899.

**Dubois, PAUL** (1829-1905). French sculptor and painter. Born at Nogent-sur-Seine, July 18, 1829, he studied under Toussaint and at the Beaux Arts. From 1880 he exhibited regularly in both the sculpture and the painting sections of the Salon, excelling in portraiture, and became keeper of the Luxembourg and director of the Beaux Arts. He died in Paris, May 23, 1905.



Guillaume Dubois,  
French statesman





Pierre J. Dubois,  
French soldier  
Manuel

**Dubois, PIERRE JOSEPH LOUIS** ALFRED (b. 1852). French soldier. Born at Sedan, Nov. 21, 1852, he joined the French army as a lieutenant of the 24th Dragoon regiment in Oct., 1874. He saw active service in Algeria and Tunisia (1882), and again in Algeria, 1885-86. Promoted brigadier-general in March, 1905, he was made director of cavalry under the minister of war in the following Aug. In April, 1913, he was appointed commander of the 9th Army Corps, and when the Great War broke out this corps, forming part of the Second Army, under Castelnau, was heavily engaged in the region of Nancy, Aug.-Sept., 1914. Later the corps formed part of the army of Belgium, incessantly fighting from Oct. 21 to Nov. 13, 1914. Dubois was made G.C.M.G. in Dec., 1914. He was put at the head of the French Sixth Army in 1915, and in 1916 was in command at Verdun. He was placed in the reserve in 1917, after holding various commands.

**Dubovka.** Town of Russia in the govt. of Saratov. It stands on the right bank of the Volga, 32 m. N.N.E. of Tsaritsyn. There are tanneries and mustard factories, and considerable trade is done in salt. Dubovka, formerly the residence of the hetman of the Volga Cossacks, has lost its importance since the construction of the Volga-Don Rly. Pop. 17,000.

**Dubuque.** City of Iowa, U.S.A., the co. seat of Dubuque co. It stands on the Mississippi river, 168 m. W.N.W. of Chicago, and is served by the Chicago Great Western and other rlys. An important river port and rly. centre, it communicates with the E. bank of the river by three bridges. Its buildings include the Government office, the free library, several hospitals, and a number of colleges and schools, the chief being S. Joseph's College, Wartburg Seminary, and the state institute of science and arts. Situated in an important coal, zinc, and iron mining district, it has rly. workshops, flour and lumber mills, foundries, pork-packing establishments, and boot and shoe factories. First settled in 1788 by J. Dubuque, in whose memory a monument has been erected, Dubuque was founded in 1833 and incorporated in 1837, its city charter being granted three years later. Pop. 40,100

**Ducange, CHARLES DU FRESNE, SIEUR** (1610-88). French scholar. Born at Amiens, Dec. 18, 1610, and educated by the Jesuits, Ducange became a lawyer. He passed most of his life in study in Amiens and Paris, where he died Oct. 23, 1688. He edited the works of several French and Byzantine historians, Joinville among them, but his great work is his Latin glossary, 1678, which is really a compendious dictionary of medieval Latin. It has been frequently revised and enlarged, notably by the Benedictines, 1733-36, and the last edition was published at Niort, 1883-87. Ducange compiled a Greek Glossary on similar lines published in 1688.

**Ducat.** Name of a coin, generally of gold, which circulated widely on the Continent in medieval times; value, 9s. 4d. It was first coined in silver, by Roger II of Sicily, 1140. The gold ducat of Florence, coined in 1252, was followed by that of Venice, 1283. The name is derived from the word *ducatus* on Roger's money, referring to his duchy of Apulia. From Italy the coin and the name went to Hungary, Bohemia, Austria, and Germany. Its use ultimately spread to Russia, Spain, Denmark, and Holland; to Hanover, as late as George III's reign, and in 1887 to England, as the name of a trial decimal gold coin, worth 100 pence. See Sequen.

**Duccio di Buoninsegna** (c. 1260-1340). Sienese painter. The only extant work indisputably by this painter is the altar-piece for the high altar at Siena cathedral, now in the cathedral museum, representing the Virgin and Child surrounded by angels and saints. Duccio was the first Sienese painter to abandon the Byzantine tradition.

**Ducie, EARL OF.** British title borne since 1837 by the family of Moreton. The family is descended from Henry Ducie of London. His son, Sir Robert Ducie, lord mayor of London, left a large fortune which came eventually to his grand-daughter Elizabeth, the wife of Edward Moreton. Their son Matthew was, in 1720, made Lord Ducie, baron of Moreton. This title died out in 1770, but in 1763 another barony of Ducie had been created, which passed to Thomas Reynolds, a nephew of Lord Ducie. He took the name of Moreton, and his grandson Thomas was made an earl in 1837. Henry John, the 3rd earl (1827-1921), succeeded to the title in 1853. His brother Berkeley Basil (1834-1924) was the 4th earl. The family estates are mainly in Gloucestershire. The earl's eldest son is known as Lord Moreton.

**Duck** (Mid. E. *dukan*; Ger. *tauchen*, to dive). Name of the largest group of birds of the order Anseres (of the family Anatidae), which includes swans, geese, and ducks. There are over 40 genera of ducks and nearly 200 species. They are distinguished by short legs, webbed feet, and a depressed and expanded beak. All the species are more or less aquatic, and most are powerful flyers. They are mainly herbivorous, with the exception of the merganser, which lives on fish, but frogs and worms are also readily eaten. The plumage is dense and compact, so that the water readily runs off it, a property augmented by the free use of the oil gland. As a rule, the male, or drake, has more showy plumage than the female, for which the term duck is commonly reserved. All the species lay uniformly coloured eggs, and the young are able to swim shortly after being hatched.

Ducks are found all over the world, but are most numerous in the northern regions. They associate in flocks, and the majority migrate further N. for the nesting season. On the wing the flock always assumes a wedge-shaped formation, which probably helps to overcome the resistance of the air.

The numerous breeds of domesticated ducks are believed to have descended from the mallard, or wild duck, which breeds quite freely in captivity. All domesticated ducks interbreed with the wild duck, and their offspring is fertile, which goes to prove that the species is identical. The polygamous habits of the domesticated duck, the wild duck being monogamous, are probably merely the result of living under non-natural conditions. Domesticated ducks may be classed as ornamental, and those intended for the table. The ornamental varieties are mainly different species of British and foreign wild ducks maintained in a half-tame state on lakes and in parks.

Less than a dozen European breeds can be regarded as of practical utility for the table or for supplying eggs. Of these the Aylesbury is by far the most esteemed and most commonly bred variety in Great Britain. Its plumage is pure white, and it carries its boat-shaped body almost level with the ground. As it matures rapidly and attains a weight of from 8 lb. to 10 lb., it is much in demand for table purposes. The Rouen, for which France is famous, is simply a cultivated mallard. In plumage almost identical with the wild bird, it often attains a weight of 11 lb., and its flesh is much superior to

that of any other native breed. But it is not altogether in favour outside France, for it matures so slowly that it often costs more in food than it fetches in the market. The Pekin duck, which came originally from China, may be re-



Duck Bill. Oviparous mammal of Australasia

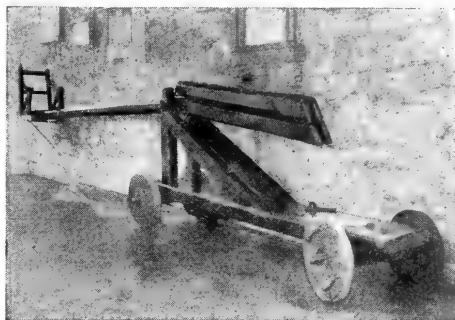
cognized by its yellowish-white plumage and its very upright carriage when walking, the legs being set very far back. A large specimen will weigh as much as 9 lb., but it is as an egg-layer that the breed is valued. The Indian runner is also a prolific layer of small eggs, which are often proffered for sale as those of the hen, but otherwise it is not a useful breed, as it seldom weighs more

than 4 lb. Swedish and Flemish ducks are also limited extent in Britain, and possess good table qualities.

The demand for ducklings far exceeds that for older birds, which are apt to be oily and strong in flavour, and the breeder should, therefore, aim at mating the birds early, Oct. being the best time. As ducks are not good sitters, the eggs are usually taken to be hatched under a hen or in the incubator. See Poultry Farming.

**Duck** (Dutch *doek*, linen cloth). Untwilled fabric, lighter and finer than canvas, used for clothing, sails, wagon covers, bags, etc. It is usually made of linen, sometimes of cotton. The word also denotes the creamy tint of linen yarn during bleaching.

**Duck Bill, DUCK-BILLED PLATYPUS OR DUCKMOLE.** Small web-



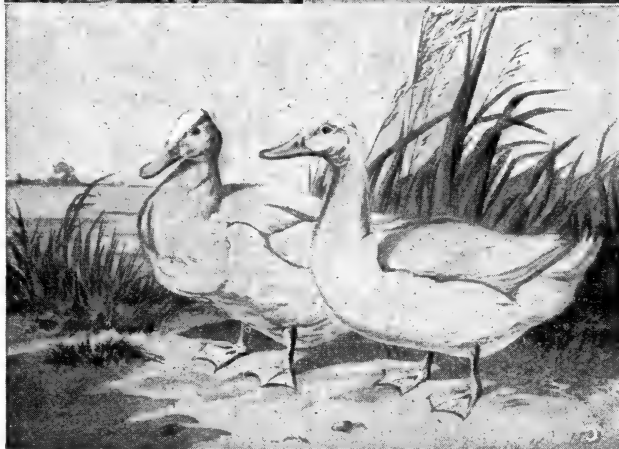
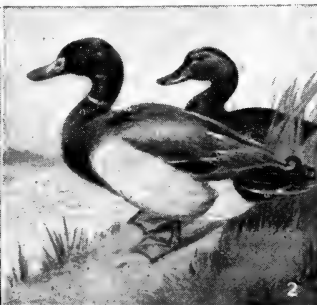
Ducking Stool. Example in the Priory Church, Leominster

footed and oviparous mammal (*Ornithorhynchus anatinus*), with a snout like the bill of a duck. It is about 18 ins. in length. No ears are visible above the fur, though the hearing is acute; the nostrils are placed near the tip of the bill. The hind feet of the male are armed with hollow spurs, communicating with poison glands, and probably used for fighting in the nuptial season. The duck bill has no teeth, but is provided with two pairs of horny plates on each jaw. It is peculiar to Australasia. See *Ornithorhynchus*.

**Ducking Stool.** Instrument formerly in use in Great Britain and in certain parts of the U.S.A. for the punishment of scolds. It consisted of a chair fastened to the end of a beam which, projecting over a pond or river, worked on a pivot from a post at the water's edge. The victim, usually a woman, was tied in the chair, and ducked by lowering the beam. The last record of its infliction was at Leominster, 1809.

**Duck-Shooting.** Sport mostly practised on the E. shores, inlets, estuaries, and broads of Great Britain. It may roughly be divided into (1) shooting with stanchion guns fixed in single or double handled punts; (2) from a punt with an ordinary gun while the birds are in flight; (3) and following on foot by open streams or drains.

The British wild ducks principally met with are the mallard, shoveller, gadwall, pochard, teal, and widgeon. These generally feed on fresh waters, and are therefore more valuable for eating purposes; scaup, eider, and the long-tailed ducks seldom leave the sea, and are useless as food. Wild ducks are very difficult to approach, and when using a punt it is necessary to lie flat along the bottom directly birds are sighted, and to remain in that position until after the shot.



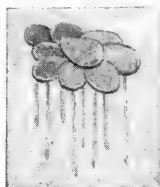
Duck. 1. Mallard or wild duck, which breeds freely in captivity. 2. Rouen duck, much favoured in France. Its plumage is similar to that of the wild variety. 3. White Aylesbury ducks, the most esteemed and most commonly bred variety in Great Britain (from a drawing by Harrison Weir)

It is the practice in some countries to mask the bows of the boat with green leaves and branches; and in some instances decoy birds (*q.v.*) are used to induce the wild ducks to come near. See First Lessons in the Art of Wildfowling, 1896; Bird-Life of the Borders, 2nd ed. 1907, A. Chapman.

**Duckweed**

(*Lemna*). Genus of minute, scale-like floating plants of the natural order Lemnaceae. They are annual aquatic plants, floating on the surface of ponds and ditches, and consisting of a green disk, with or without a simple root or roots. They sometimes produce elementary flowers in the clefts of the margin, but rarely seeds, and are propagated by budding and by bulbils which hibernate in the mud.

**Duckworth, Sir Dyce** (b. 1840). British physician. Born Nov. 24, 1840, and educated at Liverpool,



**Duckweed.** A thick-leaved variety, *Lemna gibba*

he afterwards studied medicine at Edinburgh University and St Bartholomew's Hospital. After a short time (1864-65) as assistant surgeon in the navy, he settled down to a



**Sir Dyce Duckworth,** British physician  
*Blott & Fry*

consulting practice in London. He was made consulting physician to Edward VII, when prince of Wales, treasurer and then senior censor of the Royal College of Physicians, and consulting physician to St. Bartholomew's and the Seamen's Hospitals. From 1904-10 he was medical referee to the Treasury. In 1886 Duckworth was knighted, and in 1909 was made a baronet.

**Duckworth, Sir John Thomas** (1748-1817). British sailor. Born at Leatherhead, Feb. 28, 1748, he entered the navy when 11 years old, and was present at Quiberon Bay. He then served in N. America and the W. Indies, and was promoted commander in 1780. Returning to England in 1793, he was appointed to the Orion, in which he greatly distinguished himself at Ushant, June 1, 1794.

Knighted in 1801, in 1803 he was commander-in-chief of Jamaica, was promoted vice-admiral 1804, and defeated the French off San Domingo in 1806, for which he received a pension of £1,000 a year.

The following year he was sent to Constantinople to dictate certain conditions to the Porte. With the

assistance of the French, the Turks had strengthened the fortifications of the Dardanelles, but Duckworth forced the straits, destroyed a squadron of Turkish frigates, and finally anchored 8 m. from Constantinople, where he was held up by wind and current, and, his force being insufficient, he was obliged to retreat. He was governor of Newfoundland from 1810-13, and was made a baronet in 1813. He was appointed commander-in-chief of Plymouth in Jan., 1817, and died Aug. 31 of the same year.

**Duckworth, Wynfrid Laurence Henry** (b. 1870). British anthropologist and anatomist. Born at Liverpool, June 5, 1870, and educated at Birkenhead School, Dinan, and Cambridge, he studied medicine in Paris and London, and anthropology in Paris. In 1898 he became university lecturer in physical anthropology at Cambridge. He published Morphology and Anthropology, 1904; Prehistoric Man, 1912, etc.

**Duclaux, Madame** (b. 1857). British poet and essayist. Born at Leamington, Feb. 27, 1857, daughter of G. T. Robinson, she is also known under her maiden name of Agnes Mary Frances Robinson, as Madame Darmesteter—her first husband was James Darmesteter (*q.v.*)—and as Madame Duclaux. She married Emile Duclaux, director of the Pasteur Institute, Paris, in 1901. Her first volume, A Handful of Honeysuckle, appeared in 1878. Her Collected Poems, displaying much lyrical charm, appeared in 1901; in addition may be noted studies of Emily Brontë, Margaret of Angoulême, Mme. de Sevigné, Renan, Twentieth Century French Writers, 1914, and A Short History of France, 1918.

**Du Cros, William Harvey** (1846-1918). British business man. Born June 19, 1846, he belonged to a Huguenot family that had migrated to Dublin from Montpellier in 1702. He was educated for the medical profession in Dublin, but soon turned his attention to the pneumatic tire industry, and later became largely interested in the motor industry. From 1906-8 he was Unionist M.P. for Hastings. He died Dec. 21, 1918. Of his sons, Arthur Philip was M.P. for Hast-



**Sir J. T. Duckworth,** British sailor  
*From an engraving*

ings, 1908-18, and then for the Clapham division of Wandsworth. In 1916 he was made a baronet. A younger son, Alfred, was M.P. for Bow and Bromley in 1910.

**Ducrow, Andrew** (1793-1842). Equestrian performer and mimic. Born in Southwark, Oct. 10, 1793, the son of a celebrated strong man, he was early trained to equestrian and other circus feats. In 1808 he was chief equestrian and ropedancer at Astley's; and in 1813 gained fame as a pantomimist in the part of Florio the dumb boy, in The Forest of Bondy. After touring the Continent, he returned to Astley's, which he eventually took over. On June 8, 1841, the building was totally destroyed by fire. His mind gave way under the shock, and he died Jan. 27, 1842.

**Ductility.** In metallurgy, the general property of metals which permits them to be drawn into rods or wire. It is closely related to the property of malleability, but it is not quite the same; though, as it happens, gold and silver are at once the two most malleable and most ductile of all the metals. The relative measure of the ductility of a metal is determined by the fineness of the wire down to which it can be drawn; thus gold will draw finer than platinum. The metals rank as follows in order of ductility: 1, gold; 2, silver; 3, platinum; 4, iron; 5, nickel; 6, copper; 7, zinc; 8, tin; 9, lead. The ductility of iron is greatly increased when the iron is converted into steel; and similarly many of the copper alloys—bronze, phosphor bronze, Delta metal, and others, have greater ductility than copper. See Metallurgy.

**Dudeney, Mrs. Henry** (b. 1866). British novelist. Eldest daughter of Frederick Whiffin, she was born Oct. 21, 1866, and educated at Hurstpierpoint, Sussex. In 1884 she was married to Henry Ernest Dudeney, author of The Canterbury Puzzles, Amusements in Mathematics, etc. Her novels include A Man with a Maid, 1897; The Maternity of Harriott Wicken, 1899; Folly Corner, 1899; Spindle and Plough, 1901; The Story of Susan, 1903; The Wise Woods, 1905; The Orchard Thief, 1907; Married when Sued, 1911; Set to Partners, 1913; The Secret Son, 1915; Travellers' Samples, 1916; The Head of the Family, 1917.



**Mrs. Henry Dudeney,** British novelist  
*Russett*

**Dudley.** County and mun. bor. of Worcestershire. In a detached portion of the county, it is 8 m.



Dudley arms

N.W. of Birmingham and 121 from London, and is served by the L. & N.W. and G.W. Rlys.; also by a canal. Electric tramways run through the town and to adjoining places. Dudley is in the heart of the Black Country; there are coal and iron mines all around, with which the chief industries are connected—ironworks, brass foundries, engineering works, and the like. Cycles and beer are also made and stone is quarried.

The buildings of the town include the parish church, a town hall, school of art, and grammar

times. The barony remained in the family until its ninth holder died without sons in 1643. It passed then to his granddaughter, the wife of a wealthy goldsmith, Humble Ward, and in this way the two families became connected. Ward's son Edward succeeded, but in 1757 the barony fell into abeyance.

Meanwhile, another branch of the Wards was becoming prominent, and John Ward, another descendant of Humble, who had inherited the barony of Ward, was made Viscount Dudley in 1763. His grandson, John William Ward, 4th viscount (1771–1833), was foreign secretary in 1827–28, and a prominent figure in his day. In 1827 he was made earl of Dudley, but the title became extinct on his death in 1833. Another descendant of Humble Ward, William Ward (1817–85), inherited much of his great wealth, and in 1860 was made earl of Dudley.



Dudley, Worcestershire. The town hall

*Valentine*

school. There is a hospital, founded by Joseph Guest, a technical school, and a geological museum. There are the ruins of the castle around which the town grew, the grounds being now a public park. Adjacent to Dudley, but in Staffordshire, are Brierley Hill and Kingswinford, while Netherton is another industrial suburb. Dudley existed before the Norman conquest, and was a borough in medieval times, being represented in Parliament in 1295. Its present incorporation, however, only dates from 1865. It is governed by a mayor and council, and sends one member to Parliament. Market day, Sat. Pop. 51,079.

**Dudley, EARL OF.** English title held by the family of Tudor since 1860. In much earlier times there was a baron of Dudley, who lived in Dudley Castle. The first baron, who lived in the 14th century, was named Sutton, but his descendants took the name of Dudley from their residence. Among them were Elizabeth's favourite, Robert Dudley, earl of Leicester, and other noted men of Tudor

Dudley. The earl's eldest son is known as Viscount Ednam, and his chief seat, until its sale in 1920, was Witley Court, Worcestershire.

**Dudley, DUD** (1599–1684). English ironmaster. Natural son of the fifth Baron Dudley, he was educated at Balliol College, Oxford. In 1619 he was placed in charge of his father's ironworks at Pensnet, Worcestershire, where he experimented with coal as furnace fuel. In spite of successful demonstrations, in 1651 he was forced to abandon his attempts. During the Civil War he was colonel in the king's army, and general of ordnance to Prince Maurice. In 1665 he published his work *Metallum Martis* or Iron Made with Pit-Coale, etc., but was careful not to describe his process. He died at Worcester, Oct. 25, 1684.

**Dudley, EDMUND** (d. 1510). English lawyer. He studied at Oxford and Gray's Inn, and early gained the favour of Henry VII. While still very young he was made a privy councillor, and in 1504 became Speaker of the House of Commons. Working with

another lawyer, Richard Empson, he enriched himself and the king by a system of extortion based mainly on antiquated penal statutes. The day after Henry VIII's accession, Dudley and his colleague were arrested. They were found guilty of constructive treason, and were executed on Tower Hill, Aug. 18, 1510.

**Dudley, SIR HENRY BATE** (1745–1824). British journalist. Born at Fenny Compton, Warwickshire, Aug. 25, 1745, he was the son of a clergyman, Rev. Henry Bate. Educated at Queen's College, Oxford, he entered the Church of England and became, in succession to his father, rector of North Fambridge, Essex. However, he took his duties very lightly, and it is as a journalist and society figure that he is known. He was editor of *The Morning Post* from 1772 to 1780 and afterwards founded *The Morning Chronicle*. His writings were often violent, while his behaviour was eccentric: always ready for a duel, he was called the fighting parson, and he spent at least one term in prison. In 1784 he took the name of Dudley on succeeding to some money, and in 1813 he was made a baronet. At one time he lived in Ireland, where he had livings and was chancellor of the diocese of Ferns. He died at Cheltenham, Feb. 1, 1824. The friend of Garrick and of other notables of the time, Dudley wrote several comic operas. See *Noble Dames* and *Notable Men of the Georgian Era*, J. Fyvie, 1910.

**Dudleyport.** Village of Staffordshire, England. It forms a ward of the urban district of Tipton and has a station on the L. & N.W.R. See *Tipton*.

**Dudweiler.** Town of Germany, in the Prussian Rhine province. It stands on the Sulzbach, 40 m. from Metz, near a coalfield, and its manufactures include machinery and other kinds of iron goods, bricks, and pottery. Pop. 21,932.

**Duel** (Lat. *duellum*, old form of *bellum*, battle, from *duo*, two). Single combat engaged in by arrangement after challenge, and carried through on a recognized method of procedure, to settle a private quarrel or vindicate personal honour.

Historically the duel derives directly from the old legal method of settling disputes by ordeal by battle. The legal sanction given to decisions so arrived at commended the method to the popular mind, and the issue of a duel came to be accepted as a definitive settlement of a dispute between individuals over matters with regard to which they deemed it either undesirable or useless to appeal to law.



Duel. Sword and Dagger Fight, a masterly representation of a sixteenth century duel, from the painting by John Pettie. R.A.

France is the country of origin of the modern duel. It was forbidden in civil matters as early as 1305, but without effect, and in the next two centuries duelling was generally prevalent. Francis I sent a challenge to Charles V of Germany, and although it was not accepted, this royal example was enough to sanction a fashion peculiarly congenial to the national temperament. It grew under Charles IX and became almost a mania under his successors, the third and fourth Henrys and Louis XIII, despite more than one ordinance and edict threatening penalty of death to principals and seconds alike. Rosstand's picture of Cyrano de Bergerac and his brother cadets is no caricature of the young gallants of that day who mistook swashbuckling for chivalry, and who doffed cloak and drew rapier on any pretext or none. These hot-heads found a quarrel everywhere, and soon were not content with one second apiece, while the second for his part ceased to be content with looking on to see fair play. In the reign of Louis XIV the dukes of Nemours and Beaufort fought a duel in which four friends joined in on each side. Three of the ten were killed, including Nemours, and all the other seven were wounded. The duel had almost grown into a battle. As in Italy, as pictured by Shakespeare in *Romeo and Juliet*, again no exaggerated caricature, so in France duelling became an intolerable evil.

Despite the spectacular encounter mentioned, Louis XIV has the credit of doing much to suppress the practice, by establishing a supreme court of honour, and still more by insisting on the punishment of all who disregarded the edict against it. As a practice, chiefly indulged in by

the aristocracy, the Revolutionists ignored it in their legislation, and during the first Republic and the first Empire it almost died out. It was revived, however, with the Restoration, and remains a custom in France, resorted to for the most part by ebullient editors and politicians, and not often a bloody business, although as late as 1900 M. Marlier, a municipal councillor, was killed by M. Ferrette, a deputy, in Paris. A bill to stop duelling was submitted to the French Chamber in 1920.

In England duelling dates back as a custom to the beginning of the 17th century, in the latter part of which, after the Restoration, it experienced a great revival. Beau Fielding went out with Sir Henry Colt, the member for Westminster, in Feb., 1696, and wounded the baronet, who, however, succeeded in disarming his opponent. Lord Byron killed Mr. Chaworth in 1765, and the duke of York met Colonel Lennox in 1789. Mr. Christie killed Scott, editor of *The London Magazine*, Feb. 16, 1821, and on March 21, 1829, the duke of Wellington had a bloodless encounter with the earl of Winchelsea. On July 3, 1843. Colonel Fawcett died of wounds received two days before in a duel with his brother-in-law, Lieut. Munro. The case led to action by the Prince Consort with regard to the military etiquette of duelling, in obedience to which alone Munro had gone out. In the event it was ordained in the articles of war that any officer who participated in a duel, whether as principal or as accessory, or who did not do his best to prevent a duel, should be cashiered, and the regulation is still in force.

In the German army, up to the revolution of 1918 at least, officers

were required to submit disputes to a council of honour which arranged the matter if possible, and, if not, supervised the conditions of the encounter. The German students' duels are a more or less harmless form of university amusement. By English law duelling is an offence amounting to murder or manslaughter in the event of a death, and Major Campbell was hanged, in 1808, for having killed Captain Boyd in the previous June. In 1813, again, when Lieut. Blundell was killed in a duel, his opponent, Mr. Maguire, and both the seconds engaged, were convicted of murder and sentenced to death. In the event they were pardoned, but cashiered. On Oct. 19, 1852, when E. Barthélemy shot M. Cournet, an ex-officer of the French navy, at Crown Farm, between Windsor and Egham, both principals and seconds were refugees. Barthélemy, notwithstanding ferocious professions of Republicanism, was always suspected by other French refugees of being in the pay of the French police, and the cause of the duel was political.

**Duet** (Ital. *duetto*). Composition for two single voices or instruments, occasionally a double theme for a single instrument. In instrumental music the expression is used generally for a work for two similar instruments, e.g. two flutes. When written for different instruments, e.g. violin and flute, the more correct term is duo.

**Dufaure, JULES ARMAND STANISLAS** (1798-1881). French advocate and politician. Born at Saugon, he was minister of the interior for a short period in 1848, and again in 1849. After a long period of office he was minister of justice, 1871-73, and again from 1875-76. From March 9 to Dec. 2, 1876, he was premier at a period of particular difficulty, when feeling ran high between the parties of Church and State. Both the president, Marshal MacMahon, and the senate were opposed to the premier's policy, and he resigned, only to return to office once more as premier on Sept. 14, 1877, until Feb. 1, 1879. He died at Paris. June 28, 1881.

**Duff, ALEXANDER** (1806-78). Scottish missionary. Born in Perth-



Alexander Duff, Scottish missionary

shire, April 26, 1806, he was educated at St. Andrews. In 1829 he went as a missionary to India, the first sent by the Church of Scotland, and



at once began the task of associating educational with evangelistic work. He was instrumental in setting up many schools and colleges. He had much to do with founding Calcutta University, and for a time headed The Calcutta Review. At the disruption of 1843 Duff followed the leaders of the Free Church, and in 1851 he was its moderator, as he was again in 1873. In his later years he was professor of missions at New College, Edinburgh, and travelled all over the world in the interests of his work. He wrote *The Indian Mutiny*, 1858. Duff, who is commemorated by Duff Hall, Calcutta, died Feb. 12, 1878. See *Life*, G. Smith, 1879.

**DUFF, SIR ALEXANDER LUDOVIC** (b. 1862). British sailor. Born Feb. 20, 1862, he entered the navy. Promoted lieutenant of the royal yacht in 1884, he was naval assistant to the 3rd sea lord from 1905-8, and was appointed A.D.C. to the king on Aug. 21, 1911. The same year he became director of naval mobilisation, Admiralty War Staff, which office he was holding on the outbreak of the Great War. Promoted rear-admiral in 1913, he commanded the 4th battle squadron, 1914-17, being mentioned in dispatches and given the C.B. for his action in the battle of Jutland. From 1917-19 he was assistant chief of the naval staff, was promoted vice-admiral in 1918, and made commander-in-chief of the China squadron in 1919.

**DUFF, SIR BEAUCHAMP** (1855-1918). British soldier. Born Feb. 17, 1855, the son of Garden W. Duff, of Hatton Castle, Aberdeenshire, and educated at Glenalmond, he passed through Woolwich, and in 1874 entered the artillery. Having served in 1878-80 against the Afghans, he transferred to the Indian army. In 1895 Duff was made military secretary to the commander-in-chief in India, and in 1899 was in S. Africa, first with Sir G. White in Ladysmith and then on the staff of Lord Roberts.

Having returned to India, he commanded a brigade, and was made a major-general. From 1903-6 he was adjutant-general in India, from 1906-9 chief of the staff there, being knighted in 1906, and in 1913 became commander-in-chief. He was in India when the Great War broke out, and his share in or-

ganizing the expedition to Mesopotamia was severely censured by the commission of inquiry. This undoubtedly hastened his death, which took place Jan. 20, 1918.

**DUFF, SIR MOUNTSTUART ELPHINSTONE GRANT** (1829-1906). British author and politician. Born Feb. 21, 1829, at Eden, Aberdeenshire, he was educated at Edinburgh and Balliol College, Oxford, and was called to the bar at the Inner Temple, 1854. M.P. for the Elgin

Burghs, 1857-81, he was under-secretary of state for India, 1868-74, and for the colonies, 1880. From 1881-86 he was governor of Madras. He wrote many books, chiefly biographical and political, but will be best remembered for his series of *Notes from a Diary*. Other works include: *Studies in European Politics*, 1866; *A Political Survey*, 1868; *Notes of an Indian Journey*, 1876; *Sir Henry Maine*, a brief memoir, 1892; *Ernest Renan*, 1893; and a biographical notice of Baron de Tabley in that writer's *Flora of Cheshire*, 1899. He died at Chelsea, Jan. 12, 1906.

**DUFFERIN and Ava, FREDERICK TEMPLE HAMILTON-TEMPLE BLACKWOOD, 1ST MARQUESS OF** (1826-1902). British diplomatist and administrator. Born at Florence, June 21, 1826, son of the 4th Baron Dufferin and Helen Selina, granddaughter of Richard Brinsley Sheridan, he was educated at Eton and Christ Church, Oxford. He succeeded in 1841 to his father's title, an Irish one, and in 1850 was made a British peer as Baron Clandeboyne. He went as special commissioner to Syria in 1860 to inquire into the religious massacres, was appointed under-secretary for India in 1864 for war in 1866, and was created an earl in 1871.

Governor-general of Canada, 1872-78, and viceroy of India, 1884-88, he became ambassador at Rome in 1888. and in Paris in

*Dufferin and Ava*

1891. In 1888 he was created marquis of Dufferin and Ava.

After an exceptionally brilliant career, Lord Dufferin's later years

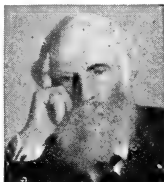
were clouded by his unfortunate action in 1897 in accepting the chairmanship of the London and Globe Finance Corporation, of which Whitaker Wright (*q.v.*) was managing director, without adequate inquiry into its affairs, over which he had no control, but for the disastrous collapse of which he had to share the blame. This and the death of his eldest son, the earl of Ava, who was killed in South Africa in 1900, led to a breakdown in health, and he died at Clandeboyne, Feb. 12, 1902. See his *Speeches in India*, 1890; *Life*, Sir A. C. Lyall, 1905. He was succeeded by his second son, Lord Terence Temple-Blackwood (1866-1918), on whose death the title passed to his third son, Lord Frederick Blackwood (b. 1875).

**DUFFERIN, LADY** (1807-67). Irish song writer. Eldest daughter of Tom Sheridan, and grand-daughter of Richard Brinsley Sheridan, she married in 1825 Commander Price Blackwood, who succeeded his father in 1839 as Baron Dufferin (d. 1841). She then devoted herself to the education of her son, the future marquess of Dufferin (*q.v.*). In 1862 she married the earl of Gifford, then on his deathbed. She died at Highgate, June 13, 1867. Her best known poem is *The Irish Emigrant*, 1845. See *Songs, Poems, Verses*, with *Memoir of the Sheridan Family*, ed. by her son, 1894.

**DUFFY, SIR CHARLES GAVAN** (1816-1903). Irish nationalist and colonial statesman. Born at Monaghan, April 12, 1816, in 1842, with John Dillon and Thomas Davis, he founded *The Nation*, the organ of the Young Ireland party. M.P. for New Ross from 1852-55, he afterwards emigrated to Australia. He became a member of the Victoria House of Assembly, 1856, was twice minister of land and works, and in 1871 prime minister of Victoria. Knighted in 1873, he died at Nice, Feb. 9, 1903. Besides political writings he published the popular anthology, *Ballad Poetry of Ireland*, 1845.

*Charles Duffy*

Elliott & Fry



Sir M. Grant Duff,  
British author  
Elliott & Fry



Lady Dufferin,  
Irish song writer  
By courtesy of John Murray



Sir Beauchamp Duff,  
British soldier  
Elliott & Fry



**Dugdale, Sir William** (1605-86). English antiquary. Born at Shustoke, Warwickshire, Sept. 12,



*Guillemus Dugdale*  
From a portrait in the Bodleian Library

1605, he came to London in 1635 to collect materials for his *Antiquities of Warwickshire* (1656). His royalist leanings led to his receiving several heraldic appointments, which he utilised for various county "visitations." He was made Garter king-of-arms and knighted in 1677. He published a *History of S. Paul's Cathedral*, 1658; collaborated in a history of religious foundations, *Monasticon Anglicanum*, 1655-73; compiled a *History of Embanking and Draining of Fens and Marshes*, 1662; and *The Baronage of England*, 1676-76. He died Feb. 10, 1686. See *Life, Diary, and Correspondence*, ed. W. Hamper, 1827; *Athenaeum*, Nov. 3, 1888, in which portions of his diary were first printed.

**Dugong** (*Halicore*). Genus of herbivorous aquatic mammals, known as sea-cows. They are found in the Red Sea and around the E. Indies and Australasia. From 8 to 12 ft. long, they resemble a miniature whale.

**Dug-out.** Primitive form of boat or canoe. In forest regions riverain tribes familiar with floating logs, probably soon developed a method of hollowing out a tree trunk by means of fire or an adze. See *illus.* pp. 1211, 1653 and 2207.

**Dug-out.** Term used in the Great War for an underground shelter for troops. Dug-outs were constructed in or near the fire

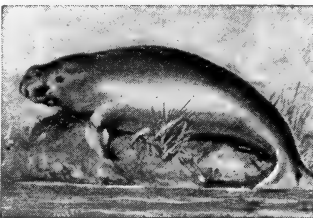


Dug-out. Bomb-proof dug-out roofed with sandbags, concrete, and timber

trenches to provide rest accommodation for the officers and men by day and night, and as comparatively safe cover from bombardments. See *Trench*.

**Duguay-Trouin, René** (1673-1736). French sailor. Born at St. Malo, June 10, 1673, in early youth he gave up clerical studies and took to the sea, where he distinguished himself in the war against England and Holland. He obtained a commission in the French navy in 1697 and fought with distinction in the War of the Spanish Succession, capturing Rio de Janeiro in 1711. He died at Paris, Sept. 27, 1736.

**Duhamel, Jean Pierre François Guillot** (1730-1816). French metallurgist. Born near Coutances, he was officially appointed to visit



Dugong, or sea-cow, a large aquatic mammal

the mines of Forez and two years later the Harz. By his discoveries and inventions he greatly improved steel manufacture in France. From 1781-1811 he held the professorship of mining and metallurgy at the French school of mining. In 1795 he was appointed inspector-general of mines. He died Feb. 19, 1816.

**Dui or Due.** Fortified post and penal settlement on the W. coast of the island of Sakhalin. It was founded in 1857 on the site of some coal mines worked by convict labour. The vicinity produces fireproof clay for brick-making.

**Duiker Bok.** Small S. African antelope of the genus *Cephalophus*. There are nearly 40 species, varying in size from the dimensions of a hare to those of a small donkey. They have short straight horns, usually with a crest of hair between them, and are of light and graceful form. *Pron. Diker*.

**Duisburg.** Town of Germany, in the Rhine prov. It stands between the Rhine and the Ruhr rivers, 15 m. N. of Düsseldorf, and owes its great growth in the 19th century to the collieries. Its industries include founding, engineering, shipbuilding, and the manufacture of cotton goods, soap, etc.

Duisburg, once a Roman station, was included for some centuries in the duchy of Cleves, and with it be-

came part of Brandenburg in 1614. During the troubles of 1919-20 there were several risings in the town. Pop. 229,483.

**Dujailah.** Fortified Turkish position on the S. bank of the Tigris. It was the key to the Es-Sinn position, which barred the way of the British Kut relief force, 1916. Unsuccessfully attacked on March 8, it was carried by the British, May 19. See *Es-Sinn; Kut; Mesopotamia, Conquest of*.

**Dujana.** Native state of India, in the Punjab. Its founder was Abdul Samand Khan, a Pathan soldier of fortune, who was employed under Lord Lake. Opium and grain are the chief products. Chief town, Dujana, 37 m. W. of Delhi. Area, 100 sq. m. Pop. 25,485, four-fifths Hindus.

**Du Jardin, Karel** (c. 1625-78). Dutch landscape painter. Born probably at Amsterdam, he studied under Nicolaas Berchem and at Rome. On his return to Holland he met with great success, but he preferred to make Italy his home, and died in Venice. His landscapes are Italian rather than Dutch in feeling. The National Gallery, London, possesses a representative example of his work. He died Nov. 20, 1678.

**Duke** (Lat. *dux*, leader). Title of nobility. The word was first applied to military commanders in the early Roman empire. Later, as in the Frankish empire, a duke was a civil and military official. There were also territorial dukes, who ruled over large districts, e.g. Saxony. Gradually all the dukes became territorial. In Great Britain duke is the highest title of nobility. The first English duke was Edward the Black Prince, created duke of Cornwall in 1337. The first Scottish duke was David, son of King Robert III, who was made duke of Rothesay in 1398. See *Peerage*.

**Duke, Henry Edward, Baron Mervivale** (b. 1855). British lawyer. As a journalist he was for a time in the press gallery of the House of Commons. Called to the bar in 1885, he soon acquired a large practice on the western circuit. In 1900



Duke. The ducal coronet



Sir Henry E. Duke, British lawyer  
Elliot & Fry



he entered Parliament as Unionist M.P. for Plymouth, lost his seat in 1906, but in 1910 was returned for Exeter. In 1915 he was made attorney-general to the prince of Wales, and early in the Great War he acted as chairman of two royal commissions appointed in connexion therewith. In May, 1916, Duke occupied the chief-secretaryship of Ireland, vacated by Birrell after the outbreak of rebellion in Dublin, and retained the post until 1918, when he was appointed a judge of the court of appeal, and knighted. In Oct., 1919, he succeeded Lord Sterndale as president of the Probate, Divorce, and Admiralty Division, and in 1925 was created a peer, taking the title of Lord Merrivale.

**Duke of Albany.** British armed boarding steamer. She belonged to the L. & Y. and L. & N.W. rly. companies, and had a tonnage of 1,997. She was torpedoed by a German submarine, Aug. 24, 1916.

**Duke of Cornwall's Light Infantry.** English regiment. Originally of two battalions, the old 32nd,



Duke of Cornwall's  
L.L. badge

and the old 46th Foot, it was raised in 1702 and served as Marines in the defence of Gibraltar, 1704-5. It took part in the battles of Dettingen and Fontenoy, the conquest of Canada (1760), the capture of Copenhagen (1807), the Peninsular War, the Waterloo Campaign, the second Sikh War, and the Crimean War. A great episode in the regiment's record was its defence of Lucknow during the Indian Mutiny. Later it took part in the Egyptian Campaign (1882), the Nile Expedition (1884), and the Burma and Tirah expeditions. In the S. African War the regiment was commanded by Sir Horace Smith-Dorrien. The nicknames, Red Feathers and Murray's Bucks, are popularly associated with the regiment. The former dates from the American War, when the old 46th, after surprising the Americans at Brandywine, stained the feathers of their headgear red in order that they might be more easily identified by the enemy. The latter commemorates a colonel of the regiment.

In the Great War the first battalion went to France in 1914, and was brigaded with Sir Charles Fergusson's Fifth Division, especially distinguishing itself on the Aisne and at Ypres. The second battalion was in China at the outbreak of war, but was sent to France and rendered fine service at St. Eloi and

Neuve Chapelle (1915). The regiment was commended by Sir Douglas Haig for gallant fighting at Guillemont and Ginchy in the battle of the Somme (1916). To commemorate its part in the war it was decided to erect a statue of Cornish tin at Bodmin, representing a soldier in fighting kit going "over the top," with at the base shields, one for each battalion, briefly recording their respective war services. The regimental depot is at Bodmin.

**Duke of Edinburgh.** Ship of a class of British cruisers built in 1906. They are two in number, the



Duke of Edinburgh. British cruiser, sister ship of the Black Prince, built in 1906  
Cribb, Southsea

Duke of Edinburgh and the Black Prince. The Duke of Edinburgh is 480 ft. long, 73½ ft. in beam, has a normal displacement of 13,550 tons, and has engines of 23,000 h.p. giving a speed of 23 knots. Her main armament is six 9·2-in. guns, four 6-in. guns, with strong batteries of lighter weapons, and three torpedo tubes. She has an armoured belt tapering from 6 ins. to 3 ins. in thickness, with 7-in. plating on barbettes and a protective deck. The Duke of Edinburgh assisted Indian troops in capturing Turkish forts at the S. end of the Red Sea, Nov. 15, 1914. Of this class the Black Prince was lost in the battle of Jutland, 1916, as the result of an explosion while attacking in Arbuthnot's squadron. She displaced 13,550 tons and carried six 9·2-in. guns. See Cruiser.

**Duke of York Islands.** Group of islands formerly part of the Bismarck Archipelago (*q.v.*). They were captured by an Australian force from the Germans, Sept., 1914.

**Duke of York's School.** Formerly known as the Royal Military Asylum, this school, for the sons of British soldiers, founded at Chelsea, London, by Frederick, duke of York, in 1801-3, was transferred to Dover in 1909. A similar establishment in Dublin is called the Royal Hibernian School. At Dover and Dublin about 920 boys are maintained and educated between the ages of 9 and 14. The Queen Victoria School for the sons of Scottish soldiers and sailors at Dunblane maintains 275 boys. To commemorate the old boys of the Duke of York's Royal Military

School who fell in the Great War a library and reading room are to be built at Guston (Dover).

**Duke of York's Theatre.** London theatre, in St. Martin's Lane, W.C., designed by Walter Emden and originally known as the Trafalgar Square Theatre. In it Ibsen's *The Master Builder* was produced in 1893. It was reopened

and renamed the Duke of York's in 1895, and was associated with many of Sir James Barrie's plays.

**Dukeries.** District in the N.W. of Nottinghamshire. It covers an area about 100 sq. m. and stretches from just N. of Mansfield to Worksop. It is usually entered from Edwinstone, where the G.C. Rly. crosses the district. Ollerton is another centre. Including the remains of Sherwood Forest, it has some fine woodland scenery.

Coal mines have been opened in the southern part of the district. The name is due to the fact that in the 18th century four dukes resided here. At Welbeck Abbey was the duke of Portland; at Clumber the duke of



Dukeries, Nottinghamshire. The Duke's Drive, showing some of the trees for which this district is famous

Newcastle; at Thoresby, now the seat of Earl Manvers, the duke of Kingston; and at Workop Manor the duke of Norfolk.

**Duke Town.** Former name of Old Calabar, situated on the Calabar river, Nigeria. See Calabar.

**Dukhonin, GENERAL.** Russian soldier. During the early part of the Great War he held important staff appointments. His ability was recognized by his appointment as chief of staff of the Northern Army early in 1917. He was made commander-in-chief by Kerensky early in Oct. of that year, in succession to Korniloff, and tried to stem the increasing disorganization of the armies. After the *Lenin coup d'état*, Nov. 7, he was superseded because he refused to negotiate an armistice with the Germans. Remaining loyal to Russia, he continued to act as commander-in-chief at the front after the flight of Kerensky. On Dec. 3, 1917, he was captured at Mohilev by a naval guard, and after being insulted was stabbed and killed. See Kerensky; Korniloff.

**Dukinfield.** Mun. bor. of Cheshire, England. It stands on the Tame, and is mostly within the parl. bor. of Stalybridge, 6 m. E. of Manchester by the G.C. and L. & N.W. Ry. The principal buildings are the town hall, free library, technical school. There are churches, schools, a public park and recreation grounds. The borough unites with Stalybridge, Hyde, and Moseley in a joint system of electric tramways and lighting. The chief industries are cotton manufacture, calico-printing, iron-working, engineering, and coal-mining. A bridge across the Tame connects Cheshire with Lancashire. Market day, Mon. Pop. 19,422.

**Dukla Pass.** Pass over the Carpathian Mts. between Galicia and Hungary. It is named after Dukla, a town of Galicia, 17 m. S.E. of Jaslo. See Carpathians, Fighting in the.

**Dulac, EDMUND** (b. 1882). Franco-British artist. Born at Toulouse, he settled in Great Britain in 1905. In 1907 an exhibition of his drawings at the Leicester Galleries caused a sensation; and his illustrations to fairy tales and other classics enjoy a wide popularity. His Book for the French Red Cross (1915) is specially memorable. An exhibition of his caricatures was given in London in 1920.

**Dulce.** Gulf or inlet of the Pacific Ocean, between Costa Rica and Panama. At its entrance are the points of Matapalo on the N. and Burica on the S.

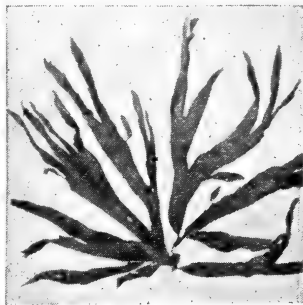
**Dulciana** (Lat. *dulcis*, sweet). Organ stop. The pipes in it are open and of small scale, possessing a delicate tone. Its invention is ascribed to Snetzler (18th century). They are usually of 8 ft. pitch, but are sometimes 16 ft. or even 4 ft. See Organ.

**Dulcigno** (anc. *Olcinium*; Turk. *Olgun*). Harbour of Montenegro, on the Adriatic. Though deep and commodious, it is difficult of access. The town is built on Cape Kadilie, a rocky promontory, and trades with Italy in olives and oil. Formerly Byzantine, it was in turn Serbian and Venetian, and became Turkish in 1571. During the Great War it was captured by the Austrians in Jan., 1916, and occupied by the Italians in Nov., 1918. Pop. 5,000.

**Dulcimer** (Lat. *dulcis*, sweet; Gr. *melos*, song). Musical instrument, from which the pianoforte has been evolved. It consists of a trapezoidal-shaped sounding-board, over which metal strings are stretched. These are struck by two hammers with flexible stems, and heads of which one side is hard and the other

—an idealisation of a farm girl, Aldonza Lorenzo. She is shown to him by Sancho Panza as a country wench riding an ass, and he is persuaded that she is the victim of enchantment. See Cervantes; Don Quixote.

**Dulse** (*Rhodymenia palmata* and *Dilsea edulis*). Two fleshy, purple seaweeds of the natural order Rhod-



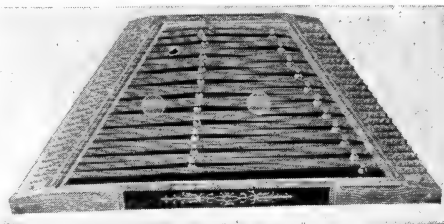
Dulse. Leaves of *Rhodymenia palmata*, an edible seaweed

dophyceae, growing on rocks in shallow water. The name belongs more especially to the first mentioned, which is used as food by the Scottish Highlanders and the Irish, who call it dilisk, not only as an ingredient in stews, but when dried as a substitute for chewing tobacco.

**Duluth.** City of Minnesota, U.S.A., the co. seat of St. Louis co. At the W. end of Lake Superior, 152 m. N.E. of St. Paul, it is served by the Chicago and Milwaukee and other rlys., and is the terminus of three of the lines. It has one of the best natural harbours in the world, formed by Minnesota Point, a narrow tongue of land which parts it from the lake. The waterway of the Great Lakes and the ample rly. facilities make Duluth one of the leading commercial ports in the country. Its industrial establishments include steel and iron works, blast furnaces, flour and saw mills, and match factories. Settled in 1853, it was incorporated as a city in 1870 and has grown rapidly since. Pop. 97,077.

**Dulverton.** Market town and parish of Somerset, England. It stands on the Barle and near the S. edge of Exmoor, 20 m. W. of Taunton. It has a station on the G.W. Rly. In the midst of lovely scenery, it is a fishing and hunting centre. Near is Pixton Park. Dulverton is referred to in Blackmore's Lorna Doone. Pop. 1,526.

**Dulwich.** London residential suburb. It lies S.E. of the city, between Denmark Hill, Herne Hill, and West Norwood on the W., and Peckham Rye, Nunhead, Forest Hill, and Upper Sydenham on the E. The oldest part, which retains



Dulcimer, covering 3 octaves. There are 4 strings to each note, and the instrument contains 21 bridges

By courtesy of Barnes & Mullins

padded. The dulcimer, or cimbalom, is an important feature in Magyar bands.

**Dulcin, DULCITOL OR MELAMPYRITE.** Sweet-tasting substance obtained from Madagascar manna, *Melampyrum nemorosum*, and other plants. From Madagascar manna it is obtained by treatment with boiling water; from *Melampyrum nemorosum* by boiling the plant, dried when flowering, with water, adding milk of lime to the decoction until it is just alkaline, again boiling, and then decomposing the filtered liquid with hydrochloric acid. The dulcin then separates out and is purified by recrystallization. It is produced artificially by the action of sodium amalgam on lactose and galactose.

**Dulcinea del Toboso.** In Don Quixote, the imaginary lady to whom the Don consecrates himself

much of its rural charm, is known as the Village, and contains the buildings, much restored, of the college founded by Edward Alleyn, the chapel of which has served as the parish church and as a chapel of ease, the rest of the quadrangle being offices and almshouses. Dulwich Park, 72 acres, was presented to the public by the college trustees in 1890. Dulwich Picture Gallery is notable for its perfect quiet, as well as for its artistic treasures.

On a site occupied by the Grove Hotel stood the Green Man, a noted hostelry in the 18th century, in the grounds of which was a well producing the once famous spa-water ;



Dulwich. Toll gate in the rural part of this residential London suburb

and here, later, was Dr. Glennie's Academy, which had Byron for a pupil. Anciently known as Dilwyshe, Dulwich was a manor belonging to the abbey of Bermondsey, presented after the dissolution to Thomas Calton, from whom it was purchased by Edward Alleyn. S. Stephen's Church, College Road, designed by Sir Charles Barry, was built in 1869, in the Early English style ; S. John's, a Gothic structure, in E. Dulwich, dates from 1865. Dulwich is served by the S.E. & C. and L.B. & S.C. Rlys., and by electric trams from Blackfriars. See Alleyn, Edward ; consult also Norwood and Dulwich, Past and Present, A.M. Galer, 1890.

**Dulwich College** OR THE COLLEGE OF GOD'S GIFT. English public school at Dulwich, founded and endowed by Edward Alleyn, the actor, in 1619. The property, which is land in S. London about  $3\frac{1}{2}$  m. in length by  $1\frac{1}{2}$  m. in breadth, increased enormously in value, and in 1857 a new scheme was approved by Parliament and carried out. This provided for two schools, an upper school, Dulwich College proper, and a lower school, known as Alleyn's School.

The college contains four sides, classical, modern, science, and engineering. It has ample buildings, laboratories, workshops, etc., and



Dulwich College. The modern buildings of red brick in the Italian style, situated in College Road, Dulwich, and opened in 1870

extensive playing fields. The new buildings of red brick in the Italian style were from the designs of Sir Charles Barry. They are in College Road, and were opened in 1870.

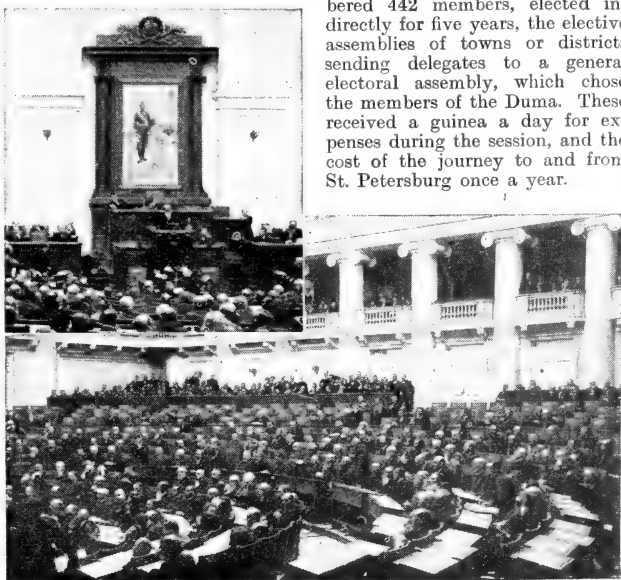
The boys number about 700, most of them day boys from the residential suburbs of S. London, but there are four boarding houses. There are a number of scholarships to the school, and from it to the universities. Over 3,000 Old Alleynians served in the Great War, of whom 441 were killed. The decorations won include

five V.C.'s, 76 D.S.O.'s, and 175 M.C.'s.

**Dulwich Gallery.** Collection of pictures housed in a building near old Dulwich College. Noel

Joseph Desenfans (d. 1807), a London dealer, left his pictures, originally collected for King Stanislaus of Poland, to his friend, Sir Peter F. Bourgeois, R.A. (1756-1811), who in turn bequeathed them to Dulwich College. Madame Desenfans commissioned Sir John Soane to design a building, which was opened in 1814. The collection of about 450 pictures is exceptionally rich in examples of the Dutch school ; but it is noted for Watteau's *Bal Champêtre*, Reynolds's *Mrs. Siddons as the Tragic Muse* (whether original or replica is a moot point), and Gainsborough's *Mrs. Sheridan and Mrs. Tickell*. There are also characteristic works by Rembrandt, Adrian van Ostade, Albert Cuyp, Gustave Doré, Murillo, Velasquez, and other masters.

**Duma.** Representative state council of the former Russian Empire. It formed, with the half-elected and half-nominated council of the empire, or second chamber, the Russian legislature. The Duma, created Aug. 6, 1905, numbered 442 members, elected indirectly for five years, the elective assemblies of towns or districts sending delegates to a general electoral assembly, which chose the members of the Duma. These received a guinea a day for expenses during the session, and the cost of the journey to and from St. Petersburg once a year.



Duma. A sitting shortly before the final dissolution in 1917. Above, President Rodzianko in the chair beneath a portrait of Tsar Nicholas II

The Duma could not touch "the fundamental laws of the Imperial Administration," but within its sphere were the making of new laws, the modification of existing laws, the national budgets, the construction of state rlys., and any matters submitted to it by Imperial Decree. The chamber could be summoned or dissolved by the ukase of the emperor. No measure was submitted to the tsar for his sanction until it had been passed by both the Duma and the Council of the Empire. The course of its brief history was stormy. The military revolution of Nov. 7, 1917, transferred the government of Russia to Commissioners set up by Lenin, and the Duma ceased to exist. See Russia, D. Mackenzie Wallace, rev. ed. 1912.

**Dumaguete.** Town of the Philippine Islands, capital of the prov. of Negros Oriental. It stands on Negros Island at the entrance to Tañon Strait, 90 m. (direct) S.E. of Bacolod. Its chief trade is connected with turtles and cotton. Pop. 15,000.

**Dumangas.** Town of the Philippine Islands, in the prov. of Iloilo. It stands on Dumangas river, near the S.E. coast of Panay Island, and has tobacco and linen industries. Pop. 12,400.

**Dumanjug.** Town of the Philippine Islands, on Cebú Island. It stands at the mouth of the Dumanjug river, 38 m. S.W. of Cebú town, and carries on a brisk trade in maize and other produce of the district. Pop. 22,000.

**Dumas, ALEXANDRE (1802-70).** French novelist and dramatist, whose full name was Alexandre Dumas-Davy de la Pailleterie. He was born at Villers-Cotterets, July 24, 1802, his father being the illegitimate son of a French noble, the Marquis Alexandre Davy de la Pailleterie, who had settled in San Domingo, and of a negress named Marie-Cessette Dumas. The father became a general in the French republican army.

About 1822 Dumas went to Paris. His first success was with a play, *Henri III et sa cour*, 1829; and competent French critics citing this piece, together with *Christine*, *Charles VII*, *La Tour de Nesle*, and *Mademoiselle de Belle-Isle*, claim for him an even higher place as a dramatist than as a teller of tales.

But to the majority of readers throughout the world Dumas is the author of that fantastic and unwearying romance, *The Count of Monte Cristo*, 1844-45, which translations have almost made a classic in numerous lan-

guages. To many English-speaking readers the most familiar of his other works are *The Three Musketeers*, *Twenty Years After*, *Memoirs of a Physician*, *The Queen's Necklace*, *Taking the Bastille*, *Chicot the Jester*, *The Black Tulip*, and other romances. Many are unfamiliar with what is beyond question Dumas' masterpiece, *Le Vicomte de Bragelonne* (26 vols., 1848-50), prodigious in extent, and scarcely rivalled in literature as a piece of pure, sparkling, and unflagging narrative.

He has set his name to a thousand or twelve hundred volumes; dramas, romances, books of travel, historical scraps, compilations on art, crime, and cookery. Clearly there was a good deal of hocus-pocus, of literary legerdemain, and worse, in the career of this amazing man. The air was charged with stories of Dumas' "ghosts," assistants, and collaborators—Maquet



*Alexandre Dumas*

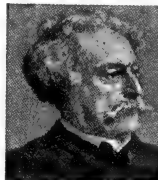
and others. It may be said (1) that Dumas, who could keep half-a-dozen plots going at once, and was burdened with few scruples as to their origin and evolution, seems to have taken help from all quarters; (2) that, whatever tasks he may have assigned to his jackals, his own brain during many years was probably equal to the creation of what is best in the wonderful romances; and (3) that not one of these associates or auxiliaries, unassisted by the master, proved his rival in any field.

The day came when the power of the great man waned. This was the day of the shifts, schemes, devices to which none but a Dumas would or could have risen or descended. He put his name to any MS. that was brought to him, started impossible newspapers, lent himself to the wiles of advertising

Paris tradesmen. He died at Dieppe, Dec. 5, 1870.

**Bibliography.** *Dumas' Memoirs*, Eng. trans. E. M. Waller, 1907; *Life and Adventures of Alexandre Dumas*, P. H. Fitzgerald, 1873; *Memoires and Portraits*, R. L. Stevenson, 1887; *Alexandre Dumas Père*, H. Parigot (in French), 1902; *Parisian Portraits*, F. Grierson, 1911.

**Dumas, ALEXANDRE, FILS (1824-95).** French novelist, dramatist, and academician. Born July 27,



*A. Dumas*

1824, he was the natural son of the famous romancer, whose dramatic genius he inherited, but with whom otherwise he had little in common. When only twenty-four he made a sensation with a novel of passion, *La Dame aux Camélias*. After this he wrote other novels (e.g. *Diane de Lys*, 1851, *L'Affaire Clémenceau*, 1866); but the success of the dramatised versions of *La Dame* and *Diane* turned his energies to the stage, and it is as a playwright rather than as a novelist that he keeps his distinctive place.

Dumas was firmly convinced of the utility of the stage for the discussion of ethical questions and as an agent of social reform, and his plays, notably *La Question d'Argent*, *Le Fils Naturel*, *Le Père Prodigue*, *L'Ami des Femmes*, *Les Idées de Mme. Aubray*, *Une Visite de Noces*, are problem plays. While as plays they suffer at times from overstress of didactic purpose, Dumas' keen sense of the stage generally saved him from sinking into the mere preacher, while his incisive wit and brilliant style further contributed to his popular success. He died at Paris, Nov. 27, 1895. See Monograph, J. Claretie, 1882, and *Nouveaux Essais de Psychologie Contemporaine*, P. C. J. Bourget, 1886.

**Dumas, JEAN BAPTISTE ANDRÉ (1800-84).** French chemist. Hewas born at Alais, in the dept. of Gard,

July 14, 1800, where he was apprenticed to a pharmacist. In 1823 he was appointed assistant to Thénard at the École Polytechnique, Paris, and shortly afterwards succeeded Robiquet as professor of chemistry at the Athenaeum.



*J. B. A. Dumas, French chemist*

Here he investigated experimentally the atomic theory enunciated a few years previously by Dalton. Then he began a study of the compound ethers, which was followed by investigations concerning other organic compounds. He established the fact that the organic acids form homologous series, i.e. series which differ from each other in chemical composition by multiples of carbon and hydrogen. He subsequently devoted more attention to physiological subjects, such as the phenomena of nutrition, the formation of sugar in the organism, and the composition of blood. In 1869 he lectured on Faraday at the Royal Institution, London. He died at Cannes, April 11, 1884.

**Du Maurier, GEORGE LOUIS PALMELLA BUSSON** (1834-96). British artist and author. Born at Paris, March 6, 1834, he studied chemistry at University College, London, subsequently setting up as an analytical chemist. In 1856 he became an art student.



*George Louis Palmella Bussan*  
Watercolor

first in Paris and then in Antwerp. In 1865 he joined the staff of Punch, then under Mark Lemon's editorship, and began his famous series of social satires. In 1881 the Royal Society of Painters in Water Colours elected him a member. His sight failing rapidly towards the close of his life, he took to novel-writing, and produced Peter Ibbetson, 1892; Tiliby, 1894 (serially in Harper's Magazine); and The Martians, published posthumously. Tiliby, largely a reminiscence of Du Maurier's student days in Paris, enjoyed an extraordinary success. These and other volumes, illustrated by him, included Thackeray's Esmond (Lib. ed.), 1869; and F. C. Phillips' As in a Looking-glass, 1889. He died at Hampstead, Oct. 8, 1896. See Memoir of Thomas Armstrong, L. M. Lamont, 1912; George Du Maurier: a review of his art and personality, T. M. Wood, 1913.

His elder son, Guy Louis Bussan Du Maurier (1865-1915), entered the army from Sandhurst in 1885. He served through the S. African War, when he gained the D.S.O., and was killed in France, March 11, 1915. He was the author of a successful play, An Englishman's Home, produced in London, 1909.

**Du Maurier, SIR GERALD** (b. 1873). British actor. Son of George Du Maurier, he was born in



**Sir G. Du Maurier,**  
British actor  
*Hugh Cecil*

Theatre. The original Captain Hook in Peter Pan, he was knighted, 1922.

**Dumba, KONSTANTIN.** Austro-Hungarian diplomatist. In 1913 he went as ambassador in Washington, U.S.A., where he came into prominence in the early part of the Great War. He was concerned in plots to defeat the Allied cause, and in 1915, together with Papen, Boy-Ed, and others, engineered a vast conspiracy with the object of disorganising the output of munitions for the Allies in American factories. He planned strikes and explosions, and in other ways abused his position. [He threatened Austro-Hungarians working in the production of war material that they would be punished if they continued to work. Documents, including a letter from Dumba to Baron Burian, the Austrian foreign minister, suggesting certain measures for handicapping the output of munitions, were found on J. E. J. Archibald. President Wilson demanded Dumba's recall, which was agreed to by Austria-Hungary, and the latter, granted a safe conduct by the British government, sailed from the U.S.A., Oct. 5, 1915.]

**Dumbarton.** Royal, mun. and parl. burgh, also a seaport and the county town of Dumbartonshire, Scotland. It stands where the river Leven falls into the Clyde, 15½ m. from Glasgow. It is on the N.B. &

London, March 26, 1873, and educated at Harrow. He first went on the stage at the Garrick Theatre, London, 1894, and in 1910 became the manager at Wyndham's



**Konstantin Dumba,**  
Austrian diplomatist



**Dumbarton arms**

Cal. Rlys. The town proper is on the left side of the Leven, but across it is the suburb of Bridgeend. The chief industry is shipbuilding, but there are also engineering works, brass foundries, and establishments for making ropes and sails.

The chief buildings include the castle, standing on a bold rock 240 ft. high; the burgh hall, the county hall, the Denny memorial, the public library, the academy, hospital, etc. Both a Celtic and a Roman settlement, Dumbarton was known as Alcluith, hill of the Clyde, and was the capital of Strathclyde. Market day, Tues. Pop. (1921) 17,428.

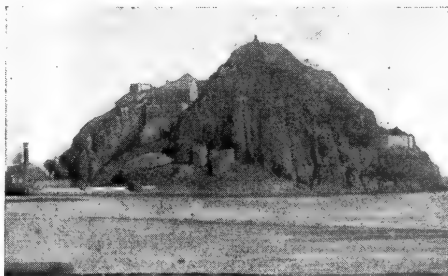
**Dumbartonshire.** Western county of Scotland. It is almost entirely surrounded by water—E.



**Dumbartonshire arms**

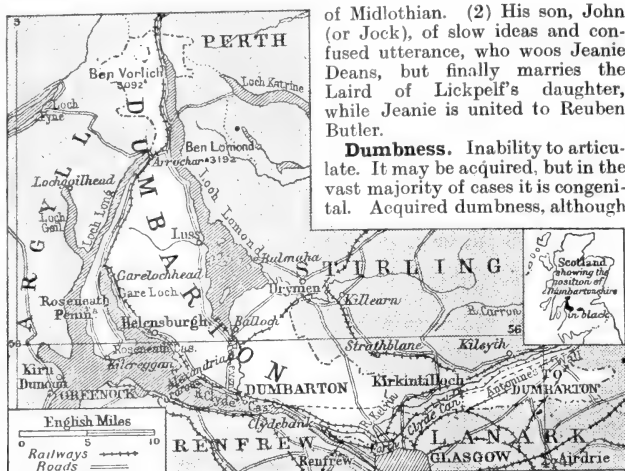
by Loch Lomond, W. by Loch Long, and S. by the Clyde estuary, a small detached part of it lying between Stirling and Lanark. The surface is mountainous in the W. (highest point Ben Vorlich, 3,092 ft.), and generally hilly elsewhere, except in the S. where the soil is well cultivated. The mountain, glen and loch scenery is magnificent. The chief rivers, after the Clyde, are the Leven and Kelvin. Roseneath Castle, on Roseneath peninsula, is a seat of the duke of Argyll. Cattle and sheep rearing, engineering and shipbuilding are thriving industries, cotton goods, glass, and sewing machines are manufactured, and along the Vale of Leven are many bleachfields and dye works. Coal, iron and slate are the principal mineral products. The N.B. and Cal. rlys. and the Forth and Clyde Canal serve the county.

**Dumbarton** (county town). Clydebank, and Kirkintilloch are the largest towns; Helensburgh and Kilebeggan are health resorts. One member is returned to Parliament. Formerly Dumbartonshire was part of the old Scottish territory of Lennox. Area, 267 sq. m. Pop. (1921) 150,868.



**Dumbarton. The Rock of Dumbarton, showing the castle where Wallace was imprisoned**





Dumfrieshire. Map of this western county of Scotland; a small detached part lies between Stirling and Lanark

**LITERARY ASSOCIATIONS.** Tobias Smollett was born near Renton, where a 60 ft. column was erected to his memory. David Gray, the poet, was born at Merkland, Kirkintilloch, and died there at the early age of 23. He is buried in Kirkintilloch churchyard. Many associations linger about Loch Lomond, which is partly in this co., notably with Scott's Rob Roy.

**Dumb-Bell.** Short iron or wooden bar with a knob at each end, used as an aid to health and by athletes as part of their training. They are grasped, one in each hand, and a series of exercises are then gone through. It is claimed that their use brings every muscle of the body into play. Iron dumb-bells, which are most in use, weigh from 4 lb. to 6 lb. each, but heavier ones are occasionally employed. They are sometimes covered with leather. The first dumb-bells consisted of sticks loaded with lead at the ends, and were so called because these ends were shaped like bells. Dumb-bells are said to have been first used in the time of Elizabeth.

**Dumb Cane** (*Dieffenbachia sequina*). Evergreen perennial plant of the natural order Araceae, native of the West Indies. It has a fleshy, cane-like stem, about 6 ft. high, and oblong, deep green leaves spotted with white. The juice is acrid and poisonous. Old-time planters are said to have punished refractory slaves by compelling them to bite the stem, which rendered them speechless for several days, owing to swelling of the mouth parts.

**Dumbdikes, THE LAIRD OF.** (1) The grasping landlord of David Deans, in Scott's novel, *The Heart*

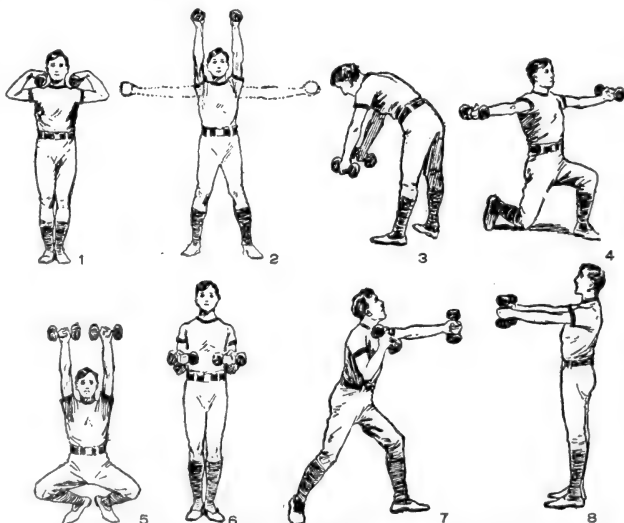
of Midlothian. (2) His son, John (or Jock), of slow ideas and confused utterance, who woos Jeanie Deans, but finally marries the Laird of Lickpelf's daughter, while Jeanie is united to Reuben Butler.

**Dumbness.** Inability to articulate. It may be acquired, but in the vast majority of cases it is congenital. Acquired dumbness, although

loudly; in the other varieties coughing is impossible or very feeble. General treatment will relieve the hysterical variety. At times a sudden fright or the application to the neck of a strong current of electricity is immediately successful. Recovery is usual from dumbness following diphtheria, but tumours require removal by operation. If the whole larynx has to be removed, speech can be regained by wearing an artificial larynx.

Congenital dumbness may be due to mental weakness, but much more frequently to deafness, congenital or acquired in infancy. The child cannot speak because it has not the use of its ears to guide its speech. Even partial deafness occurring in childhood may cause dumbness. It is important to ascertain whether the deafness is very marked or comparatively slight. Any middle ear disease or adenoids should be dealt with to improve the hearing up to its maximum. See Deaf and Dumb.

**Dum-Dum** OR DAMDAMA (Hind, raised mound). Town of India. It is in the Barraekpore sub-division of the district of the twenty-four Parganas, Bengal, 7 m. N.E. of Calcutta. The town comprises two municipalities, N. and S. Dum-Dum, the former containing the cantonment, once the headquarters of the Bengal Artillery. There is a government ammunition factory at Dum-Dum.



Dumb-Bell. Diagram of eight typical exercises. 1. The start with the bells on the shoulders. 2. Position with feet apart and bells above the head before bending down as in 3, without bending the arms or legs until the bells swing between the latter. The arms are raised above the head again and then lowered right and left until level with the shoulders (see fig. 2). 4. This position shows drop on the right knee, with left knee bent. 5. Movement to exercise the thigh and calf muscles. 6. Exercise for muscles of arms and chest. 7. The lunge movement. 8. Employment of arm and chest muscles

**Dum-Dum Bullet.** Popular term for all projectiles of small calibre which expand or flatten easily in the human body, such as a bullet with a hard envelope which does not entirely cover the core, or is pierced



Dum-Dum Bullet. Above: the projectile, and sectional view showing cavity in the nose. Below: the bullet after impact

with incisions. This class of bullet was invented to meet a demand for a projectile that would stop the rush of savages on whom the small-bore rifle-bullet of the ordinary type makes little impression. Controversy centred upon an invention of Captain Bertie Clay, of the ammunition factory at Dum-Dum, near Calcutta, and so the name has stuck to bullets, such as the official mark IV, which mushroomed on impact. This bullet actually shot better for having a cavity in the nose, but at Bisley, in 1899, it was pronounced to be dangerous to the firer, as the lead core separated from the envelope, and in the Boer War a return was made to mark II, the original cordite cartridge. See Bullet; Explosives.

**Dumfries.** Royal, parl., and mun. burgh, river port, and co. town of Dumfriesshire, Scotland.



Dumfries arms

It stands on the Nith, 82 m. S.E. of Glasgow, on the G. & S.W.R., and is connected with Maxwelltown, its suburb, by three bridges. A flourishing industrial town, Dumfries manufactures tweeds, hosiery, hats, and clogs, and has ironworks and tanneries. Among prominent buildings are the new town hall, Crichton institute for the insane, and the county buildings. Robert Burns was buried in S. Michael's churchyard, and his remains were transferred to a mausoleum erected in the churchyard to his memory in 1815; there is a marble statue of the poet (1882) in front of Greyfriars Church, the scene of the murder of Comyn, by Robert the Bruce, in 1307. Market day, Wed.- Pop. (1921) 15,778.



Dumfriesshire. Map of the south-western border county of Scotland, which has a coast-line of 21 miles along the Solway Firth

**Dumfriesshire.** Border county of Scotland, with coast-line of about 21 m. along Solway Firth. Hills (highest summit, White Coomb, 2,695 ft.) line the N., W., and E. boundaries, whence the surface declines to Lochar Moss, a marshy expanse in the S., now largely reclaimed. The county includes three sections—Nithsdale, Annandale,



Dumfriesshire arms

and Eskdale; these dales contain fine holms for pasture besides arable land. The rivers are well stocked with salmon and trout. Lochs Skene and Urr and the cluster round Lochmaben are the chief lakes; the first gives rise to the Grey Mare's Tail waterfall. Lead ore underlies the Lowther Hills in the N., and sandstone, limestone, and coal are worked. Agriculture is not extensively followed, but cattle and sheep are reared in good numbers on the abundant pastures. Moffat is visited for its mineral springs. The Cal., G.S. & W., and N.B. rlys. supply communication. Dumfries (co. town), Annan, Langholm, Lockerbie, and Moffat are the largest towns. Gretna Green (q.v.) is on the S. border. One member is returned to Parliament. Area, 1,100 sq. m. Pop. 75,365.

**LITERARY ASSOCIATIONS.** Dumfriesshire claims many associations with Scottish and English literature from the time of Hector Boece or Boethius, the 16th century historian, who, like Ben Jonson, belonged to an Annandale family. James Crichton, the Admirable Crichton, was born at Elick House, Sanguhar, while Robert Flint (1838-1910) belonged also to Annandale. W. J. Mickle, poet and translator of Camoens, was born at Langholm, and Allan Cunningham was born at Keir. The richest poetic memories of the county are associated with Burns, who passed the last eight years of his life at Ellisland, Dunscore, and Dumfries, where he died and is buried. The soldier author, Sir J. Malcolm, was born at Burnfoot, Westerkirk. Edward Irving was born at Annan. The greatest man of letters who was a native of the county was Thomas Carlyle.



Dumfries. Greyfriars Church, built in 1867, with Burns statue in front



**Dumont, François** (1751-1831). French miniature painter. Born at Lunéville, he studied under Girardet, and became an academicien in 1788. Most of his miniatures are portraits, and include those of the dauphin (Louis XVIII) and Madame Vigée Le Brun, both in the Wallace Collection. He also painted historical pieces in miniature.

**Dumont, Pierre Étienne Louis** (1759-1829). French writer. Born at Geneva, July 18, 1759, he went to St. Petersburg in 1783, to take charge of the French Protestant church. In 1785 he came to England, where he became tutor in the family of Lord Shelburne (later marquess of Lansdowne). He was in Paris during the early part of the French Revolution, and became very friendly with Mirabeau. In 1791 he returned to England, and became intimate with Jeremy Bentham, much of whose work he translated into French. In 1814 he returned to Geneva. He died at Milan, Sept. 30, 1829, leaving in MS. his *Souvenirs sur Mirabeau*, 1832 (Eng. trans. by Lady Seymour, as *The Great Frenchman and the Little Genevese*, 1904).

**Dumouriez, Charles François** (1739-1823). French soldier. He was born at Cambrai, Jan. 25, 1739.



Chas. F. Dumouriez,  
French soldier

At the age of 18 he entered the French army, and fought in the Seven Years' War. Having been sent on a mission to Poland and Sweden, he fell into disgrace; was recalled, and imprisoned for some months in the Bastille. When the Revolution broke out, he took the popular side, and became minister of foreign affairs. He resigned office to take command of the army of the north against the duke of Brunswick, whom he defeated at Valmy, Sept. 20, 1792, and in the same year he won another victory at Jemappes. In 1793 he was badly beaten by the Austrians at Neerwinden. Accused of conspiring for the restoration of the monarchy, he took refuge with the Austrians, and for some years wandered about Europe with a price on his head. He finally settled in England, where he died near Henley-on-Thames, March 14, 1823. See Dumouriez and the Defence of England against Napoleon, J. H. Rose and A. M. Broadley, 1909.

**Dumping.** Originally, the act of throwing down a large quantity of material in a heap, as in shooting rubbish. In economics the term is

applied to a practice adopted by some countries, e.g. Germany, of producing goods in vast quantities with the assistance of bounties or tariffs, and then exporting them to other countries; thus flooding the market and underselling the manufacturers there with the object of killing their industry and securing control of the market. Tariff reformers urge the imposition of tariff on imports on the ground that it would prevent dumping. On the other hand some manufacturers uphold the practice of dumping on the ground that it enables them to maintain that volume of output which is most economical to produce and thus most profitable in the long run. An act to prevent dumping in the United Kingdom, known as the Safeguarding of Industries Act, was passed by Parliament in 1921. See Political Economy; Tariff Reform.

**Dumraon.** Town of India. It is in Shahabad district, in the Patna division of Bihar and Orissa, and contains the palace of the maharaja, whose estate, Dumraon Raj, covers an area of 758 sq. miles. Pop. 15,042; five-sixths Hindus.

**Dun.** Celtic word meaning hill or fort. The dun was either a circular row of large stones on the top of a hill, or a regular building, known as a "Danish" fort, with a double wall. It is a common prefix in towns of the British islands, sometimes altered to dum-, don-, e.g. Dundalk, Dumbarton, Doncaster.

**Düna.** Alternative spelling of the Russian river better known as the Dvina (q.v.).

**Dünaburg.** Alternative spelling of the Russian town, better known as Dvinsk (q.v.).

**Dunaföldvár.** Town of Hungary. It stands on the right bank of the Danube (Duna) about 50 m. S. of Budapest. It is on a branch rly. which keeps fairly close to the river and terminates at Pács, some 16 m. farther S. It is one of the small towns which have grown up on the relatively high right bank of the river where they are secure from the floods. Pop. 12,100, mainly Magyar Roman Catholics.

**Dunajetz, BATTLES OF THE.** Fought between the Austro-Germans and the Russians, April and May, 1915. During the Russian offensive of April, 1915, in the Carpathians, Hindenburg assembled large forces in and around Cracow. His purpose was to make a fresh movement E. in Galicia, in combination with the Austro-German armies already in and about the passes, the total strength being at least 2,000,000 men, with some 4,000 guns of all calibres. The

nominal commander was the Archduke Frederick, but the real head was Mackensen.

The Russian armies in Galicia, with Ivanoff in chief command, were much inferior in numbers, especially in guns and material. From the Vistula S. to near Bartfeld, and thence E. to the Dukla Pass, stood the 3rd Russian Army, under Radko Dmitrieff. From the Dukla to the Pruth the Carpathian front was held by Brusiloff with the 8th and 9th Russian Armies, while N. of the Pruth were two corps of Russian cavalry. The total of the Russian forces was 14 corps as against the Austro-German total of 24. On the line of the Dunajetz-Biala, Dmitrieff had five corps, and when the enemy attack began in force there Mackensen disposed of 12 corps in this sector, with superior strength in artillery and munitions.

The first assault took place in the Gorlice district, however, with which coordinated assaults were delivered by Hindenburg in Courland and on the Rava, the Pilitza, and the Nida between the Lower and the Upper Vistula, in order to pin down the Russian forces N. of Galicia. On April 28 Mackensen's right wing, moving from Novo Sandec (Sacz) through Grybov on Ropa, was in position on Dmitrieff's left, on the Biala, while higher up, on the Dunajetz, the Austro-Germans were beginning to bombard his right.

As the attack from Ropa on Gorlice developed the Russians withdrew slightly N.E., and on May 1-2 their whole line from Ciekovice to Malastov, 8 m. S. of Gorlice, was subjected to an unprecedented artillery fire, which virtually wiped out the first lines of Russian trenches. Prussian troops broke through Dmitrieff's front at Ciekovice and Staszkovka, the Russians falling back towards Olpiny and Biecz. The result of the struggle in the Gorlice district was that the Russian defence was broken on a front of 10 m.

In the N., on the Dunajetz the Austrians, under the Archduke Joseph Ferdinand, tried to break through in the direction of Tarnov under heavy artillery cover, but failed on May 2-3 to get across until the Russians there withdrew in consonance with Dmitrieff's general retreat E.

Desperate fighting took place on May 3-4 between the Biala and the Wisloka, the Russians being driven back by superior numbers. To the S. a Hungarian assault rendered Jaslo untenable on May 4. S. of Jaslo Bavarians and Austrians were on the same day close to the

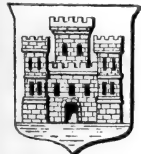
Dukla at Zmigrod and Krempna, and the Russians retreated with difficulty thence and from the Bartfeld district. On May 7 Mackensen forced a crossing of the Wisloka at Jaslo with his own individual command, which had most of his heavy artillery, and which came to be known as his "phalanx."

The Russians then fell back to the Wistok, but on May 8 were forced from it at Frystak and Rymanov. They made a stand at Dembitsa, and to cover the retreat of the Russian left from the Dukla and the Lupkov passes Ivanoff sent out strong forces from Sanok, which temporarily checked the Austro-German advance in the S. But by May 11 the retreat of the Russians was general to the San, after hard-fought delaying actions on the three preceding days on a line across Mid-Galicia from the Vistula to the Uzok Pass. During Mackensen's advance he captured upwards of 100,000 Russians, but he did not succeed in destroying the Russian armies. *See San, Battles of the.*

**Robert Machray**

**Dunaverty.** Promontory and bay of Argyllshire, Scotland. It is 5 m. N. of the Mull of Kintyre. On the promontory there formerly stood a castle, belonging to the Lord of the Isles, which was several times besieged.

**Dunbar.** Royal and mun. burgh and seaport of Haddingtonshire, Scotland.



Dunbar arms

It stands at the mouth of the Firth of Forth, 29 m. E.N.E. of Edinburgh on the N.B.R. A popular health resort, Dunbar has a good golf course and a racecourse near.

Of its two harbours the Victoria Harbour (W.) is a refuge for ships in distress. The herring fisheries are important, and other industries include rope and agricultural imple-

ment making. There are ruins of the old castle, captured by Edward I in 1296 and successfully defended against the English in 1338 by Black Agnes, the countess of Dunbar. The battle of Dunbar, in which Cromwell defeated the Covenanters, took place close to the town in 1650. These historic events indicate the strategic position of the town on the east coast route now followed by the rly. to Edinburgh. Market day, Tues. Pop. 4,830.

**Dunbar, BATTLE OF.** Fought Sept. 3, 1650, between the English and the Scots. Cromwell, seeking to crush finally the cause of Charles II, had invaded Scotland. With 16,000 men he approached Edinburgh only to find the Scots under David Leslie in a strong defensive position. Anxious to keep in touch with his supplies on board ship, Cromwell fell back to Dunbar. Then a second time he advanced to Edinburgh, but again the Scots were in a strong position, and again he retired to Dunbar.

This time Cromwell was followed by the Scots. He encamped on Sept. 1. on the low ground near the town and the coast, while Leslie on the hills sent a force to bar the road to England. Sickness was rife among the English troops, who numbered barely 11,000 effectives as against 20,000 Scots, and their position was perilous when the Scots, urged on by the ministers who were with the army, left their position of vantage in order to attack.

The Scots at first stood with their backs to England, and between them and the English was a stream called the Broxburn. Cromwell opened the engagement before daybreak on Sept. 3. by sending some of his horse and foot across the stream. The Scots were not yet ready, so the English had time to take up a position with the sea behind them and the hills in front. The infantry under

Monk advanced, as did the horsemen on either side of them; but the Scots, now fully ready, met their assault firmly. For a time there was no advantage, but at length Cromwell led up his reserves. This was decisive. The Scottish right broke, and the infantry in the centre was also routed, and the

English horsemen came round their flank. The sun was only just rising when Cromwell called out "Let God arise, let His enemies be scattered." The Scots were followed as they fled, and altogether 3,000 of them were killed. About 10,000 more, with their arms, artillery, and baggage, were taken. The English losses were slight.

**Dunbar, EARL OF.** Scottish title now extinct. Its origin is obscure, but it was certainly in existence in the 12th century when Waltheof de Dunbar, who married a daughter of William the Lion, called himself earl of Dunbar. He was descended from a family that had lands in the Lothians and a connexion with Northumbria.

Succeeding earls, mostly named Patrick, were persons of importance in Scotland. One was made regent in 1255, another was one of the claimants for the crown in 1291. This latter was called also earl of March, presumably because he had lands on the marches, and henceforward the earldom was known as that of March or Dunbar. A 14th century earl was in all the fighting between England and Scotland, being sometimes on one side and sometimes on the other. His wife was the renowned Black Agnes, who in 1338 defended Dunbar castle against the English. A great nephew, George, succeeded to the honours, and his son George was deprived of his lands and titles in 1435. In 1605 James I made Sir George Home earl of Dunbar and March. He was the lord who, by first hanging a gang of outlaws and then trying them, gave rise to the phrase Jeddart justice. He died in 1611, and the title soon became extinct. *See March, Earl of.*

**Dunbar, WILLIAM** (c. 1460-1513). Scottish poet. He is believed to have been born in East Lothian and educated at St. Andrews. Becoming a member of the Franciscan order, he travelled as an itinerant friar through Scotland, England, and part of N. France. About 1490 he entered the diplomatic service, which took him to Germany, Italy, and Spain. In 1505 he received a pension from King James IV as Court Laureate, but was unsuccessful in his efforts to obtain a benefice. The king's marriage with Margaret, daughter of Henry VII, occasioned Dunbar's most famous poem, *The Thistle and the Rose* (1503). Dunbar is not heard of after the battle of Flodden, and it is most probable that he fell on the field.

His poems also disappeared about this time, to be discovered some 200 years afterwards by



Dunbar. Ruins of the Scottish castle founded in 856, and long held as a defence against the English

Allan Ramsay in a country house. His poetical genius, influenced by Chaucer, was many-sided; the rich allegorical poem *The Thistle and the Rose* is far removed from the grim humour of *The Dance of the Seven Deadly Sins*, or the serious pieces, such as *The Passion of Christ*. See *Poems*, ed. J. Small (for the Scottish Text Society). 1884-93.

**Dunblane.** Town and police burgh of Perthshire, Scotland. It stands on Allan Water, 5 m. N.N.W. of Stirling on the C.R. It has a hydropathic establishment and a mineral spa. Once the seat of a bishopric, its cathedral is one of the few which escaped destruction at the Reformation; restored in 1893, it is now the parish church. Robert Leighton, bishop 1661-70, is commemorated by the Leightonian library, Bishop's Walk and Bishop's Well. The Queen Victoria Military School (opened 1908) is 1 m. N. of the town, and the battlefield of Sheriffmuir (1715) is 2 m. to the E. Many of the people work in the woollen mills. Market day, Thurs. Pop. 4,591.

**Duncan** (d. 1040). King of the Scots. He succeeded his grandfather Malcolm II as king in 1034. Little is known of him except that he was slain by Macbeth, thane of Cawdor, Cawdor Castle being the traditional scene of the crime. Shakespeare's version of the tragedy is based on legend.

**Duncan**, ADAM DUNCAN, VISCOUNT (1731-1804). British sailor. Born at Lundie, Forfar, July 1, 1731, he entered the navy in 1746. He was present at the actions of the Basque Roads (1757), Goree (1758), and the blockade of Brest (1759). After his return to Great Britain (1761) he saw no further service until 1778, when he was appointed to the Suffolk. In 1782 he became first lord of the Admiralty, and in the Blenheim took part in the relief of Gibraltar.

In 1795, promoted admiral, he hoisted his flag on the Venerable as commander-in-chief in the North Sea. On Oct. 11, 1797, he obtained a decisive victory over the Dutch fleet off the village of Camperdown. For this he was created Viscount Duncan of Camperdown. He died



Dunblane. The town seen from the north-west, with a view of the 13th century cathedral

suddenly Aug. 4, 1804. See Camperdown, Battle of; Camperdown, Earl of; consult also Life, 3rd Earl of Camperdown. 1898.

**Duncan**, GEORGE (b. 1883). British golfer. Duncan was seventh in the Open Championship in 1907, and played for Scotland against England in 1906, 1907, 1909, and 1910.

He won the Belgian Open Championship in 1912, and the following year was French champion.



George Duncan, British golfer  
Arthur Hawes

He won the Open Championship at Deal in July, 1920. Duncan, who became professional at Hanger Hill golf club, wrote *Golf for Women*, 1914.

**Duncan**, ISADORA (b. 1880). American dancer. One of the most interesting figures in the history of dancing, she was born at San Francisco, and made her first appearance in Chicago in 1899 without much success. In Europe, however, she attained great popularity, appearing in Paris, Berlin, Vienna, St. Petersburg, and London. Her ideal of dancing derived from nature through Greek art created a great impression. Isadora Duncan lived for some years in Paris, and founded there, and at Grünwald, near Berlin, a dancing school where children received free board and education.

**Duncan**, THOMAS (1807-45). Scottish painter. Born at Kinclaven, Perthshire, May 24, 1807, he began to study art under Sir William

Allan at the Trustees' Academy, Edinburgh. He was made a member of the Royal Scottish Academy in 1830, and succeeded Allan as master of the Trustees' Academy. In 1843 he was elected A.R.A. His large and spirited painting of Prince Charles Edward and his Highlanders entering Edinburgh



Duncansby Head, Caithness. View of the cape with two of the Stack rocks

Valentine

after the Battle of Prestonpans is one of his best works. He died at Edinburgh, May 25, 1845.

**Duncansby Head.** Promontory of Caithness, Scotland, the N.E. extremity (210 ft. high) of the mainland. Off the head are the Stacks, three small rocks, and about 2 m. to the W. is John's Groat's House.

**Dunciad**, THE. Satiric poem by Alexander Pope, first published anonymously, May 28, 1728.

The poet, who had been vulgarly abused by hack-writers of the time, unmercifully retaliated on them in this poem.

**Duncker**, MAXIMILIAN WOLFGANG (1811-86). German historical writer. He was born in Berlin, Oct. 15, 1811, and became professor of history at Halle in 1842, and sat as a Liberal in the Prussian legislature from 1849-52. Appointed professor at Tübingen, 1857, he resigned the post to enter the ministry of state in Berlin in 1859. He was director of the Prussian state archives from 1867-74. He died July 21, 1886. His chief works



Thomas Duncan, Scottish painter  
Self-portrait

are *Origines Germanicae*, 1840; *Geschichte des Alterthums*, 1852-57, Eng. trans. in two portions as *History of Antiquity*, by E. Abbott, 1877-82, and *History of Greece*, by S. F. Alleyne and E. Abbott, 1883-86.

**Duncombe**, THOMAS SLINGSBY (1796-1861). British politician. Educated at Harrow, he served



for a short period in the army. He entered Parliament in 1826 as member for Hertford, and afterwards sat for Finsbury. He presented petition to Parliament in 1842, and, actively interested in European revolutionary movements, is said to have assisted Louis Napoleon's escape from Ham in 1846. He died Nov. 13, 1861.

**Dundalk**. Urban dist. and co. town of Louth, Ireland. It stands on Castletown river, near Dundalk bay, 54 m. N. of Dublin on the G.N.I. and L. & N.W. Rlys. An important rly. centre, the G.N.I.R. has its locomotive works here, and distilling, shipbuilding, tanning, and iron-founding are active industries; agricultural and dairy produce are exported. Market day, Mon. Pop. 15,330. Here in 1315 Edward Bruce proclaimed himself king, and was killed in battle in the neighbourhood in 1318. The town surrendered to Cromwell in 1649 and to Schomberg in 1689.

**Dundalk Bay**. Inlet of the Irish Sea. It penetrates the E. coast of Ireland, co. Louth, about 6 m., and at its entrance between Cooley Point on the N. and Dunany Point on the S. its width is 7 m. It receives the waters of the rivers Dee, Glyde, Fane, and Castletown, and other smaller streams. The bay affords excellent anchorage

in a depth of from 4 to 6 fathoms. Several fishing villages stand on its shores.

**Dundee**. City, parl., royal, and co. burgh, and seaport of Forfarshire, Scotland. It stands on the N. shore of the Firth of Tay, 59½ m. by rly. N.N.E. of Edinburgh, on the Cal. and N.B. Rlys., and is the third largest town in Scotland. The Tay Bridge, opened in 1887 in place of an earlier structure destroyed in 1879, is 3,593 yds. long (see plate facing p. 1374). Prominent buildings include the town hall

central reading room and sculpture gallery and five branch libraries situated in the various districts.

The Town Churches—three beneath one roof—are the most notable of many churches. Educational institutions are represented by the University College, founded in 1880 by Miss Baxter and Dr. J. B. Baxter, opened



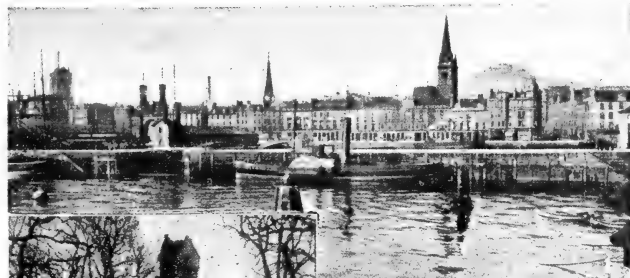
Dundee arms

in 1893, and incorporated with the university of St. Andrews in 1897; the technical institute, founded and endowed by Sir D. Baxter and opened in 1888; the high school with museum; and the Morgan Academy.

Dundee has a commodious harbour extending for 2 m. along the river, with a dock



Dundalk. Front of the Roman Catholic Cathedral; its design is based on that of King's College Chapel, Cambridge.



area of 38 acres. The annual trade of the port is about £7,000,000.

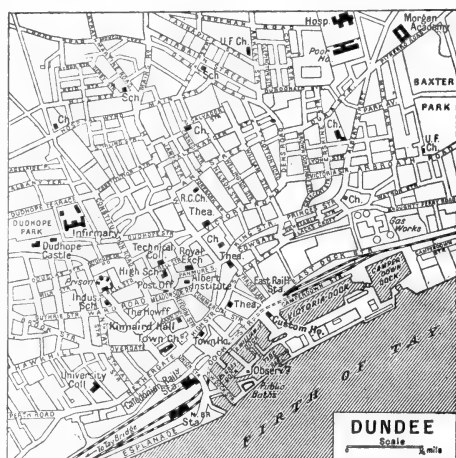
Dundee is the chief British port for the seal and whale fishery. The city, moreover, is the centre of the Scottish linen industry, while its jute, hemp, and flax manufactories are among the most extensive in the world. Other industries include engineering, shipbuilding, dyeing, and fruit preserving, Dundee being noted for its marmalade. The largest public parks are Baxter Park, 37 acres; Baggay Hill, 36 acres; Lochee Park, 25 acres; and Cairo Park, 178 acres. Dundee Law, the hill at the back of the town, is a well-remembered landmark. Two members are returned to Parliament. Market days, Tues. and Fri. Estimated pop. of mun. bor. (including Broughty Ferry). 189,000.

(1734), royal exchange (1853-56), custom house (1843), and new City Hall (1914-20). The Albert Institute, which commemorates the Prince Consort, contains the art gallery, free lending library, museum, and reference and commercial libraries. There are also a



Dundee. 1. General view of the city from the docks. 2. Ruins of Mains Castle, once the residence of Claverhouse. 3. Town Churches: the churches of S. Mary, S. Paul, and S. Clement under one roof, and the 12th century steeple

Valentine



Dundee, Scotland. Plan of the city, showing chief public buildings and docks

Dundee (Lat. *Taodunum*, hill or fort on the Tay) was besieged by Wallace in 1297 and sacked by the marquess of Montrose in 1645. In 1651 Gen. Monk burned the town and massacred a large number of the inhabitants. It was among the first Scottish towns to adopt the doctrines of the Reformation, and here Wishart preached during the plague of 1544. See illus. facing p. 1374.

**Dundee, JOHN GRAHAM OF CLAVERHOUSE, VISCOUNT** (c. 1649–89). Scottish soldier. The eldest



Graham of Claverhouse, Viscount Dundee

After Lely

Holland, distinguishing himself in 1674 at the battle of Seneff, where he is said to have saved the life of the prince of Orange. He was sent as a cavalry leader to Scotland, 1678, with orders to enforce conformity to the established church, and by his relentless repression of the Covenanters earned the name of "Bluidy Clavers." In 1688 he was created Viscount Dundee by James II. He was an ardent supporter of the Stuart cause, and was mortally wounded at the battle of Killcrankie, July 17, 1689. The title became extinct when his son died in the same year. The use of "Bonnie Dundee" as an epithet for Graham dates from Sir Walter Scott's song, the original old ballad of that name being concerned

solely with the town of Dundee. See *Covenanters*; consult also *Lives*, C. Sanford Terry, 1905; M. Barrington, 1911.

**Dundonald, EARLOF**. Scottish title borne since 1669 by the family of Cochrane. In 1647 Sir W. Cochrane, a supporter of Charles I, was made a baron, and in 1669 earl of Dundonald. His grandson John became the 2nd earl, which title passed to other descendants. William, the 7th earl, was killed at the

siege of Louisburg in 1758. Thomas, the 8th earl, followed. Archibald, the 9th earl, was a noted scientist, while his son Thomas, the 10th earl, was the famous admiral.

In 1885 his grandson Douglas (b. 1852) became the 12th earl. A soldier, he saw service in various campaigns in Egypt and the Sudan, and in 1899–1902 went through the S. African War. In 1902–4 he commanded the Canadian militia, returning home after a speech which the authorities regarded as indiscreet. His seat is Gwyrch Castle, Abergele, N. Wales, and his eldest son is known as Lord Cochrane. Dundonald is the name of a large parish in Ayrshire, which contains the ruins of a castle, long the residence of the Cochrane.

**Dundonald, THOMAS COCHRANE, 10TH EARLOF** (1775–1860). British admiral. He was born at Annsfield, Lanark, Dec. 14, 1775, the eldest son of the 9th earl. In 1793 he entered the navy, and in 1801 he captured a Spanish frigate. In 1806 he became M.P. for Honiton and in 1807 for Westminster, and as a Radical became known by his denunciation of abuses in the navy.



Dundonald  
From an engraving

In 1809 Dundonald took part in the attack on the French squadron in the Basque Roads. He contended that he had not been properly supported by Gambier, the admiral in command. A court-martial was held, by which Gambier was acquitted and Cochrane consequently discredited.

In 1814 he was unjustifiably arrested with others in connexion with a false rumour affecting the funds, and was sentenced to a year's imprisonment and a fine of £1,000. He was struck off the navy list, expelled from the House of Commons, and ignominiously removed from the Order of the Bath. The amount of his fine was raised by popular subscriptions.

In 1817 Cochrane accepted the command of the Chilean navy and, 1819–23, carried out a series of daring and brilliant exploits. In 1823–25 he commanded the Brazilian, and, 1827–28, the Greek navy. In 1831 he became 10th earl of Dundonald and in 1832 was granted a "free pardon" for a crime which he had not committed, and restored to his rank in the navy. In 1847 he was reinstated in the Order of the Bath. He was an early advocate of the use of steam in the navy, and was the author of the famous secret war plan, by which he claimed that he could destroy any fleet or fortress in the world. He died at Kensington, Oct. 31, 1860, and was buried in Westminster Abbey. The eldest son, Thomas Barnes (1814–85) then became the 11th earl.

**Bibliography.** Dundonald's Narrative of Services in the Liberation of Chili, Peru, Brazil, 1859, and Autobiography of a Seaman, 1860; Life, by his son and H. R. Fox Bourne, 1869; Dundonald, J. W. Fortescue, 1895; The Trial of Cochrane before Ellenborough, J. B. Atlay, 1897.

**Dundreary, LORD.** Character in Tom Taylor's comedy of Our

American Cousin, first produced in New York, 1858. Originally designed as a subsidiary part, it was so developed by its creator, E. A. Sothern, that it became the chief character. Dundreary is a good-natured but foolish man of fashion, conspicuous for his side-whiskers.

**Dundrum**

**Bay.** Inlet of co. Down, Ireland. It extends from St. John's Point to Dullish Cove, a distance of 9 m. Dundrum Harbour is on the N. of the bay. On St. John's Point is a lighthouse.



Lord Dundreary, as impersonated by E. A. Sothern



**Dune** (Fr. *dun*, hill). Hill formed of sand. Where the prevailing winds are relatively steady, dunes may gradually advance, owing to the particles of sand being driven by the wind up the dune and over the crest to the leeside. Sand dunes occur in deserts, where they often present a monotonous succession of crests and troughs, and along sandy coasts, e.g. Belgium, Holland, Germany, and Denmark. In deserts, any obstacle, such as a cactus or a large stone, is sufficient to start the building of a dune, although desert dunes may be formed without such aid. The typical isolated desert dune is crescent-shaped, its horns pointing in the direction of the prevailing wind, while the windward is steeper than the leeward slope.

**Dunedin.** Chief city in South Island, New Zealand. It stands on Otago Harbour, 8 m. S.W. of Port Chalmers. It has good sea communication with other N.Z. ports, Sydney and Melbourne, and is the chief rly. junction on the main E. Coast line. The town is surrounded by a forest preserve called the Town Belt. The most important manufacturing centre of the Dominion, its chief industries are woollen manufactures (Mosi-giel and Roslyn), refrigerating works, bootmaking, foundries, and rolling mills. A great educational centre, most of the churches have their residential colleges at its university (opened 1871), which possesses medical and dental schools and a school of mines. It is the seat of Anglican and Roman Catholic bishops. Its museum, containing remains of the moa and other rare N.Z. birds, and art gallery are important buildings. Pop. 55,256: with suburbs, 68,716.



Dunedin. Plan of the city and docks of the principal port of South Island, New Zealand

Founded in 1848 by members of the Free Church of Scotland, its commercial prosperity dates from the discovery of gold in Otago in 1861.

**Dunedin, ANDREW GRAHAM MURRAY, 1st BARON** (b. 1849). British lawyer and politician. Born Nov. 21, 1849, he was the only son of T. G. Murray of Stenton, Perthshire, crown-agent for Scotland. Educated at Harrow and Trinity College, Cambridge, he became an advocate in 1874 and a Q.C. in 1891. In the same year chosen M.P. for Buteshire, he entered the Unionist ministry as solicitor-general for Scotland. In 1895 he was again appointed to that position, and in 1896 was promoted to be lord advocate. From 1903-5 he was secretary for Scotland and a cabinet minister.

of Austria, one of its leaders being the great Condé. With it were five English, Scottish, and Irish regiments under James, duke of York. To aid France Cromwell had sent six regiments of his Ironsides.

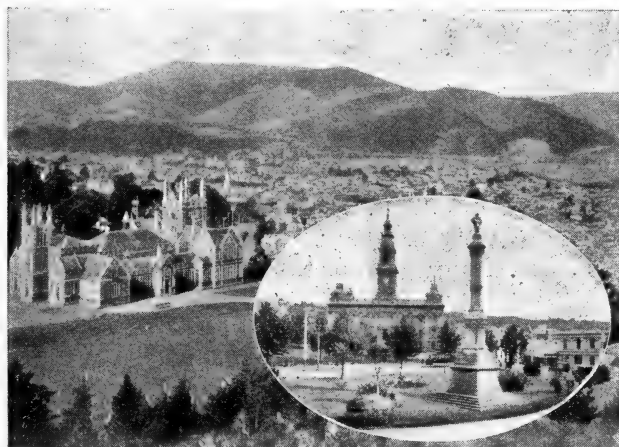
The French were arranged in the conventional order of battle, cavalry on the wings and infantry in the centre, the English being on the left centre. The Spaniards had a line of infantry in front with the horsemen in column behind. On their left was the canal to Bruges, and the French stood with their backs to Dunkirk. The battle began with the advance of the English foot against the Spaniards' strongest position, a sand hill held by veterans. In spite of heavy losses they reached the hill and drove back the Spaniards. A few of the royalist English horsemen tried to save the day, but supports arrived for the Ironsides, and soon this wing of the Spanish army was completely broken. On the other wing, the Spaniards and their allies offered a poor resistance. The victory led to the fall of Dunkirk.

**Dunfermline.** Royal and municipal burgh of Fifeshire, Scotland. It stands on the Firth of Forth,



Dunfermline arms

17 m. N.W. of Edinburgh, and is on the N.B.R. Since 1911 the burgh has been extended to include the new naval base at Rosyth. It was a favourite residence of the Scottish kings, and the Benedictine abbey, founded by Malcolm Canmore in 1072, was their burial place from the 11th to the 14th century. The abbey was



Dunedin, New Zealand. General view from Roslyn, with Boys' High School in foreground. Inset: The Octagon, showing town hall and memorial to the Rev. Thomas Burns





Dunfermline. The New Abbey Church, built in 1821 on the site of the old abbey, of which a tower and some remains are seen on the right

partly demolished by Edward I, and except for the nave, which did duty as the parish church till 1821, was destroyed by the Reformers in 1560. In Pittencrieff Glen, which, with the estate and an endowment yielding £25,000 per annum, were presented to the burgh in 1903 by Andrew Carnegie, a native, are the ruins of Malcolm Canmore's castle and palace. The garden city between Dunfermline and Rosyth is a famous example of town planning. The town is celebrated for its table-linen, and is also engaged in ironfounding, distilling, bleaching, and dyeing. Market day, Tues. Pop. '39,886.

**Dungannon.** Urban dist. and market town of co. Tyrone, Ireland. It is 40 m. W. of Belfast on the G.N.I.R. It was the ancient residence of the O'Neills, titular kings of Ulster, who founded castles and an abbey of which no traces remain. There is a grain trade and linen and muslin manufactures. It returned two members to the Irish Parliament, and from 1601 to 1885 was represented by one in the Parliament in London. Market day, Thurs. Pop. 3,830.

**Dungaree.** Name given to a coarse Indian calico. From it comes the word dungarees, applied to trousers of this material.

**Dungarpur.** Native state of Central India, in Rajputana. It is bounded on the N. by Udaipur. The surface is wild and rugged in the N. and E., the remaining portions being made up of jungle forest, stony tracts, and a little arable land. The chief rivers are the Mahi and Som. Products are stone and timber. The ruler is a maharawal, entitled to a salute of 15 guns. The chief towns are Dungarpur (the capital), Sagwara, and Galiakot. Area, 952 sq. m. Pop. 159,192, Hindus and Animists.

**Dungarvan.** Urban dist. and market town of Waterford, Ireland. It stands at the mouth of the Colligan on Dungarvan Bay, 28½ m. S.W. of Waterford by the G.S. & W.R.

ket days, Tues. and Sat. Pop. 4,977.

**Dung Beetle** or **DOR BEETLE** (*Geotrupes stercorarius*). Common British beetle belonging to the family Scarabaeidae. It feeds upon dung, in which it deposits its eggs as a feeding site for the future larvae, thus doing useful work as a scavenger. Metallic black in colour, and an inch long, it is often seen flying about at dusk in summer, when it makes a rather loud droning sound.



Dung Beetle, *Geotrupes stercorarius*

**Dungeness.** Low promontory on the S. coast of Kent, England. It has a lighthouse, coastguard station, Lloyds' signalling station, and small fort. The scene of many wrecks, it was off here that Tromp defeated Blake in 1652 during the first Dutch war.

**Dungeness.** Town and port of entry of Queensland, Australia. It stands on Hinchinbrook Channel, 935 m. N. of Brisbane, and is the port for the traffic, chiefly sugar exporting, on the Herbert river. Pop. (district), 7,000.

**Dungeon.** Name for a prison, especially a prison in a castle. It is derived from the Norman word donjon, meaning a keep, in which part of the castle the prisons usually were. See Castle; Prison.

**Dungog.** Town in Durham co., New South Wales, Australia. It is situated on the Williams river, which flows between Durham and Gloucester counties, in a dairying and maize district. There is a coach service to Sydney, 156 m. distant. Pop. 1,712.

**Dunite.** Massive granular crystalline rock, a species of peridotite. It consists almost wholly of opaque olivine, with some chromic iron, and is named from Dun Mt., near Nelson, New Zealand, which is surmounted by this rock. It occurs

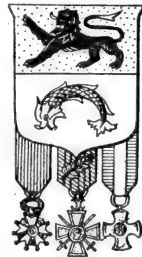
also in Andalusia, Scotland, and Kentucky.

**Dunkeld.** Market town of Perthshire, Scotland. It stands on the Tay, here spanned by a 7-arched bridge, 15½ m. N.W. of Perth by the Highland Rly. The chief object of interest is the ruined cathedral, presented to the nation in 1918 by the duke of Atholl. This was built in the 11th or 12th century, but was partially destroyed at the Reformation. The ruins include a beautiful nave, a chapter house, and a tower, as well as the choir, which has been restored to serve as the parish church. Near is Dunkeld House, a residence of the duke of Atholl. The town has a modern town hall, and in the market square is a fountain commemorating a duke of Atholl. A mile away, across the Tay, is Birnam. Pop. 600.

**Dunkers** or **TUNKERS** (Ger., dippers). Sect of Baptists founded in Germany by Andrew Mack, in 1708. About 1720 they fled under persecution to America, where their leader, Conrad Peyssel, founded a settlement at Ephrata, about 50 m. from Philadelphia. Men and women dwelt apart, marriage was forbidden, and strict vegetarianism practised. Divided into three sects, the Dunkers have numerous independent congregations in the U.S.A.

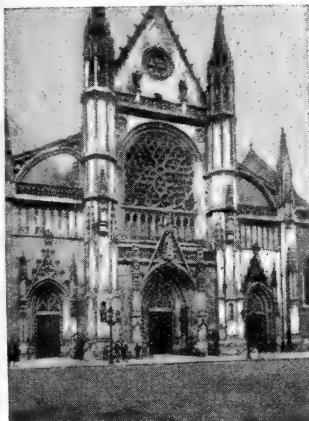
**Dunkery Beacon.** Hill on Exmoor, Somersetshire, England. About 5 m. S. of Porlock, it is 1,707 ft. high, the highest point on the moor. It is 12 m. in circumference, its slopes are covered with trees, and on the summit is a large cairn. The lighting of the beacon on Dunkery is described in Lorna Doone.

**Dunkirk** or **DUNKERQUE.** Seaport of France. It stands on the Strait of Dover, near the Belgian boundary, in the dept. of Nord, 40 m. N.W. of Lille. The flat district around it is called the Wateringues. It is still rather a Flemish than a French town. One of the chief ports of the country, it has an outer and an inner harbour, large



Dunkirk arms

floating basins, dry docks, quays, and ample accommodation of all kinds for shipping. Normally the port exports the coal of Belgium and north-eastern France, the manufactures of the industrial region therein, and the agricultural produce of other adjacent areas. Wool is a main import. Shipbuilding is carried on, while other industries



Dunkirk. West front of the church of S. Eloi

include the manufacture of machinery, soap, and the shipping accessories. There are oil refineries, saw mills, and flour mills. Steamers regularly ply between here and London, Hull, and other ports.

The old buildings include the church of S. Eloi, with a modern façade and a detached belfry, and the pilgrim chapel of Notre Dame des Dunes. The church of S. Jean-Baptiste dates from the 15th century. On the Place Jean Bart is a statue of the seaman of that name. Outside the old town are S. Pol-sur-Mer and Rosendael. Malo-les-Bains is a watering-place.

Dunkirk, meaning the church in the Dunes, was at first two small settlements around chapels named after S. Eloi and S. Gilles. It was taken and retaken by France and Spain, it having passed to the latter country with the other lands of the duke of Burgundy. From 1658-62 it was in English hands. In 1713, by the treaty of Utrecht, its fortifications were pulled down, but later in the 18th century it again took its place as a seaport and a fortress. It was besieged by the English in 1793. During the Great War Dunkirk was heavily bombed by air, and bombarded from sea and land. Pop. 38,925.

**Dunkirk.** City of New York, U.S.A., in Chautauqua co. A port of entry on Lake Erie, it is 40 m. S.W. of Buffalo, on the Lake Shore and Michigan Southern and other rlys. Industrial establishments include locomotive and gas-engine works, and agricultural implement and shirt factories. Settled in 1809, it was chartered as a city in 1880. Pop. 21,310.

**Dunlin** OR **Ox Bird** (*Tringa alpina*). Species of shore bird belonging to the Sandpiper group. It breeds rather rarely in Great

Britain, and is usually seen about estuaries. It is about 8 ins. long, and greyish coloured in winter, but in the breeding season the male is clad in chestnut and black.

**Dunlop, JOHN BOYD** (1839-1921). Irish inventor. After training, he began to practise as a veterinary surgeon at Belfast. About 1888 the idea of an inflated tire occurred to him. This Dunlop tire was placed on the market by the Pneumatic Tyre and Booth's Cycle Agency. A patent was taken out for the wire edge attachment by the Dunlop Rubber Co. This expired in 1904. He died Oct. 23, 1921. See Cycling; Tire.

**Dunmore.** Borough of Pennsylvania, U. S. A., in Lackawanna co. Adjoining Scranton on the N.E., it is served by the Erie and other rlys. In an anthracite coal district, it has rly. workshops, and manufactures silk and bricks. Settled in 1835, it was incorporated as a borough in 1862. Pop. 19,750.

**Dunmore, EARL OF.** Scottish title borne by the family of Murray since 1686. The first earl was Lord Charles Murray, a younger son of the marquess of Atholl, made baron, viscount, and earl in 1686. William, the 3rd earl, shared in the rebellion of 1745, but was pardoned, and his grandson, the 5th earl, was in 1831 made a peer of the U.K. Alexander, the 8th earl,

who succeeded in 1907, gained distinction as a soldier. He won the V.C. in 1897, and in the S. African War commanded a battalion of yeomanry. He served also in the Great War. The earl's eldest son is known as Viscount Fincastle. The family seat is in the Isle of Harris, and the extensive estates are mainly in the Highlands and islands.

**Dunmore, JOHN MURRAY, 4TH EARL OF** (1732-1809). British administrator. Son of William, the 3rd earl, he succeeded to the title in



Dunkirk. The old part of the docks, seen from the Tour de Leughebaer

1756 and was a Scottish representative peer from 1761-69. In 1770 he went to America as governor of New York and in 1771 Virginia was placed also under his authority. In 1774 he became involved in a struggle with the Indians, often called Dunmore's War, and a little later he carried on a civil war with the Virginians. He returned to England in 1776 and from 1787-96 was governor of the Bahama Islands. He died in May, 1809.

**Dunmow, GREAT.** Parish and market town of Essex, England. It stands on the Chelmer, 8 m. W. of Braintree by the G.E.R. Roman remains have been unearthed here. Market day, Tues. Pop. 2,792.

**Dunmow, LITTLE.** Parish and village of Essex, England. It stands on the Chelmer, 1½ m. S.E. of Great Dunmow.

It is celebrated for the custom of presenting a fitch of bacon to any married couple who can give satisfactory proof that they have not repented of their marriage for a year and a day after its celebration. The custom has been revived in recent years. Pop. 320.



8th Earl of Dunmore, British soldier Elliott & Fry



Great Dunmow. Main street of the Essex market town

**Dunn, JAMES NICOL** (1856-1919). British journalist. Born in Kincardineshire, Oct. 12, 1856, he was educated at Aberdeen. He was intended for the law, but joined the staff of *The Dundee Advertiser*, and later that of *The Scotsman*. He was in turn managing editor of *The Scots Observer* and *The National Observer*, under W. E. Henley, 1888-93; news editor of *The Pall Mall Gazette*, 1894; and editor of *Black and White* and *The Ludgate Monthly*, 1895-97. In 1897 he became editor of *The Morning Post*, and in 1905 of *The Manchester Courier*. In 1911 he was made editor of *The Star*, Johannesburg, and in 1914 London editor of *The Glasgow Evening News*. He was president of the Institute of Journalists in 1904. He died at Denmark Hill, June 30, 1919. Of his three sons, two fought throughout the Great War, and the other became Reuter's chief of staff in S. Africa.

**Dunnage.** Pieces of wood laid at the bottom of a ship's hold to keep the cargo from touching the deck beneath. The object is to protect the cargo from damage by any water that may find its way into the hold.

**Dunne.** Automatically stable aeroplane, designed by J. W. Dunne. The wings are V-shaped, and each wing has a variable camber and angle from shoulder to tip. See *Aeroplane*.

**Dunne, FINLEY PETER** (b. 1867). American humorist. Born at Chicago, from 1891 to 1900 he attracted notice by contributing to the *Times-Herald*, of Chicago, a series of sketches in which, speaking as Martin Dooley, an Irish-American publican, he commented on social and political topics in genially, sometimes pungently, humorous fashion. His works include *Mr. Dooley's Philosophy*, 1900; *Opinions*, 1901; *Observations*, 1902; *Dissertations*, 1906; *Mr. Dooley Says*, 1910; and *On Making a Will*, 1920.

**Dunnite.** Filling for high explosive shell. Its essential ingredient was picric acid, adopted by the ordnance authorities of the U.S.A. before the Great War. It has been superseded by trinitrotoluene and amatol.

**Dunnottar.** Town and parish of Kincardineshire, Scotland. It stands on Carron Water, 1 m. S.W. of Stonehaven. At Dunnottar in 1793 Walter Scott met Robert Paterson, the stonemason original of *Old Mortality*. Pop. 2,255.

**Dunnottar Castle.** Ruined stronghold about 2 m. S.E. of Stonehaven, Kincardineshire, Scotland. It is situated 150 ft. above

the sea, and dates from the 7th century. In one of its dungeons, known as Scotland's Black Hole or Whigs' Vault, in 1685, during the Covenanters' rebellion, 167 men, women, and children were incarcerated. Cromwell laid siege to the castle when he invaded Scotland, but did not take it until the Scottish crown jewels, placed in it for safe keeping, had been secretly removed to Kinneff Church. The castle was dismantled in 1720.

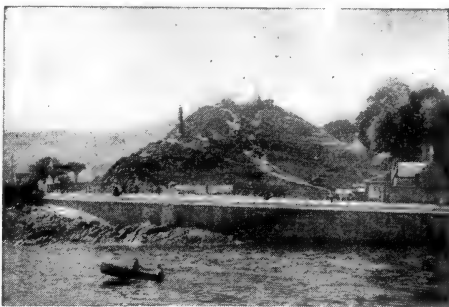
**Dunois, JEAN, COMTE DE** (1402-68). French soldier and popular hero. Born at Paris, Nov. 23, 1402, a natural son of Louis, duke of Orleans, and brother of Charles VI, he was known as the Bastard of Orleans. Originally intended for the



Dunnottar Castle. Ruins of the ancient stronghold seen from the north

Church, he became a soldier, and first came into prominence by defeating the English and raising the siege of Montargis in 1427. His next exploit was the defence of Orleans, which he held until succoured by Joan of Arc, with whom Dunois now set himself to the task of clearing the country of the English. The task was not interrupted by the capture and death of the Maid of Orleans. The taking of Chartres in 1432 enabled Dunois to expel the English from Paris; by 1450 he had driven them from Normandy; and by 1455 Guienne was once more French. He died at St. Germain-en-Laye, Nov. 24, 1468.

**Dunoon.** Town and police burgh of Argyllshire, Scotland. It stands on the W. shore of the Firth of Clyde, 8 m. W. of Greenock. Formerly a small fishing village, it is now one of the most popular



Dunoon. Ruins of the old castle and the statue of Burns's Highland Mary

Frith

watering-places on the W. coast. It includes Kinnaird Hunter's Quay, and with these the town has a frontage of three miles on the firth. There is a statue to Mary Campbell, the Highland Mary loved by Burns, who was born here. Pop. 9,859.

**Dunraven, EARL OF.** Irish title borne since 1822 by the family of Wyndham-Quinn. Valentine R. Quinn,

an Irish landowner and a supporter of the Union of 1800, was made a baronet in 1781, a baron in 1800, a viscount in 1816, and in 1822 earl of Dunraven and Mountearl. His son Windham Henry had already taken the additional name of Wyndham on inheriting valuable property in Glamorganshire through his wife,

a daughter of Thomas Wyndham of Dunraven Castle in that county. On this account the elder Quinn took the title of Dunraven on being made an earl.

Edwin, the 3rd earl (1812-71), who was M.P. for Glamorganshire 1837-51, was made Baron Kenry, a British title, in 1866. A remarkable man, he was archaeologist,



4th Earl of Dunraven Russell

astronomer, and author, and was interested in spiritualism. He became a Roman Catholic, and Montalembert was one of his friends. In 1871 his son Windham Thomas (b. 1841) became the 4th earl. In 1885-86 and 1886-87 he was under-secretary

for the colonies. He was in early life a war correspondent in Abyssinia, in Paris 1870, and in 1900 he went to S. Africa. He was at one time chairman of the Irish Reform Association and chairman of the Irish land conference, 1902-3. The earl's seats are Adare Manor, Limerick, and Dunraven Castle, Glamorganshire.

**Dunrobin Castle.** Seat of the duke of Sutherland, Sutherlandshire, Scotland. Beautifully situated on Dornoch Firth, it is one of the oldest inhabited mansions in Great Britain, the earliest portion dating from the 13th century. The main building, however, is modern. In the well-wooded grounds are two "brochs" or circular towers, and a museum of antiquities. Dunrobin Glen has a picturesque waterfall.

**Duns.** Police burgh, county and market town of Berwickshire, Scotland, 55 m. S.E. of Edinburgh by the N.B.R. The original town of Duns or Dunse was situated on Duns Law (713 ft.), which has traces of the encampment set up by the Covenanters in 1639. Linen is manufactured. Market day, Tues. Pop. 3,042.

**Dunsany, BARON.** Irish title borne since 1439 by the family of Plunkett. The first baron was Sir Christopher Plunkett, a landowner in co. Meath, from whom the title passed to his son and other successors. Randal, the 11th baron, was outlawed for adhering to James II, but this disability was removed, and his successors inherited his title and estates. Dunsany is in Meath, 7 m. from Trim. Its old castle, which became the property of Sir Christopher Plunkett, has been replaced by a modern building in the Gothic style.

**Dunsany, EDWARD JOHN MORETON DRAX PLUNKETT, 18th BARON** (b. 1878). British author. Born July 24, 1878, he was educated at Eton and Sandhurst, and held a commission in the Coldstream Guards. He served during the S. African War, and also in the Great



*Dunsany*

War. His travels in the Far East helped to give colour to some of his imaginative writings. His works include *Time and the Gods*, 1906; *The Sword of Welleran*, 1908; *The Book of Wonder*, 1912; *Fifty-one Tales*, 1915; *Unhappy Far-off Things*, 1919; *Tales of Three Hemispheres*, 1920; and several plays, including *The Glittering*



Dunrobin Castle, Sutherlandshire. View of the castle from the south-west, showing the 13th century walls and turrets

Gate, 1909; *The Gods of the Mountain*, 1911; *A Night at an Inn*, 1916.

**Dunsinane.** Peak of the Sidlaw Hills, Scotland, 8½ m. N.E. of Perth. On it are traces of an ancient fort known as Macbeth's Castle. Shakespeare has immortalised the defeat here of Macbeth by Siward, earl of Northumbria, in 1054. See Macbeth.

**Dunsink.** Hill and village of co. Dublin, Ireland. It is 4 m. N.W. of the city of Dublin. On the hill (alt. 210 ft.) is Trinity College observatory, founded in 1785.

**Duns Scotus** (c. 1265-1308). Medieval schoolman. Little but legend exists as to his personal history. Often referred to as a native of Duns, in Berwickshire, as in the case of Johannes Scotus Erigena (q.v.), his birthplace is variously assigned to England, Scotland, and Ireland. He appears to have been professor of theology at Merton College, Oxford, to have joined the Franciscans, and about 1304 to have gone to Paris, where, in contention with the Dominican upholders of the teaching of Thomas Aquinas, his dialectical skill won for him the name of Doctor Subtilis (the Subtle Doctor), and where he popularised the theory of the Immaculate Conception of the Virgin Mary, since 1854 a dogma of the

Roman Catholic Church. Sent to contend against the Beghards and Dominicans at Cologne, he died there, Nov. 8, 1308. His tomb, in the Minorite Church of S. Pantaleone, is inscribed: *Scotia me genuit, Anglia me suscepit, Gallia me docuit, Colonia me tenet* (Scotland bore me, England adopted me, Gaul

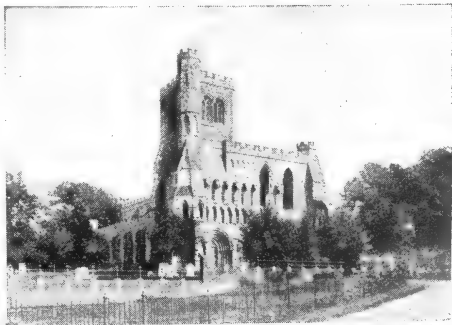
taught me, Cologne holds me).

The writings of Duns Scotus testify to his familiarity with the works of Porphyry, Boethius, Aristotle, Plato, and the Arabian and Jewish schoolmen. They concern philosophical grammar, logic, metaphysics, and theology. His commentaries on the *Sententiae* of Peter

Lombard are the more often referred to. The edition of his works publ. at Lyons in 12 vols., 1639, by Luke Wadding, an Irish Franciscan, is incomplete; another ed. appeared in Paris, 1891-95.

While his teaching appears to be no longer binding on Franciscans, his views have influenced modern theology and philosophy. To him theology was a practical science, faith an act of will, and will the controller of the intellect. Though intentionally orthodox, his philosophy has its effects in modern materialism. An exponent of the inductive principle, he anticipated Bacon and Newton. In logic a quodlibetarian, one who, stating the pros and cons of an argument, leaves his hearers to draw their own conclusions, he influenced the modern doctrine of conceptualism.

From Duns Scotus and Thomas Aquinas arose respectively the schools of Scotists and Thomists, opposed especially in regard to the Immaculate Conception, and generally as to free will, grace, and kindred topics. The Scotist views were later adopted by the Jesuits. The term dunce, originally a Duns man, was applied as a term of contempt by Thomists to Scotists. See Aquinas; Concept; Nominalism; Realism; Scholasticism.



Dunstable. Parish church of S. Peter and S. Paul, part of the priory founded in 1131. See p. 2730

**Dunstable.** Mun. bor. and market town of Bedfordshire, England. It stands at the entrance of one of



Dunstable arms

Here Cranmer held in 1533 the court which dissolved the marriage of Catherine of Aragon. Dunstable is situated at the crossing point of Watling and Icknield Streets and is thought to have been a Roman station. The grammar school, founded in 1715, was rebuilt in 1888. Straw-plaiting and printing are among the industries. Market day, Wed. Pop. 8,057.

**Dunstaffnage.** Ruined castle of Argyllshire, Scotland. It stands at the entrance to Loch Etive, 3½ m. N.E. of Oban, and dates from the 13th century. The traditional seat of the kings of Dalriada, it was wrested from the MacDougalls by Robert Bruce in 1308, and was garrisoned for the crown during the risings of 1715 and 1745. It figures in Scott's *Lord of the Isles*, and was for a time the prison of Flora Macdonald. The Stone of Destiny, which now forms part of the coronation chair at Westminster Abbey, reposed here before its transference to Scone.

**Dunstall.** Ward within the borough of Wolverhampton, Staffordshire. It has a station on the G.W.R. See *Wolverhampton*.

**Dunstan** (d. 988). English saint. The son of a West Saxon noble, he was born at Glastonbury, where he was educated, and became abbot about 945. The chief adviser of King Eadred, he was banished by his successor, Edwy, but recalled by Edgar, who appointed him bishop of Worcester in 957, bishop of London in 959, and archbishop of Canterbury in 961. From then until 979 he was the most powerful man in the country. He died May 19, 988. Dunstan is credited with skill as a metal-worker.

**Dunster.** Market town of Somersetshire, England. Situated



L. C. Dunsterville,  
British soldier

Elliot & Fry

23 m. N.W. of Taunton by the G.W.R., it is a quaint old town, containing many interesting buildings. Dunster Castle dates from the 12th century, and the Yarn

Market, a wooden structure, from the beginning of the 17th century. Market day, Friday. Pop. 1,380.

**Dunsterville, LIONEL CHARLES** (b. 1865). British soldier. Born Nov. 9, 1865, he was educated at Westward Ho College, where he had as a schoolfellow Rudyard



Dunstaffnage, Argyllshire. Ruins of the 13th century castle on the shore of Loch Etive

Kipling, who made him the hero of *Stalky & Co.* Dunsterville entered the R. Sussex Regt. in 1884, after which he joined the Indian army. He served in the Waziristan expedition, 1894-95, on the N.W. frontier, 1897-98; and in China, 1900. In the early part of the Great War he held various appointments in India, then went to Mesopotamia, where in 1918 he commanded the expedition to Baku (*q.v.*). He became a major-general in June, 1918. See his *The Adventures of Dunsterforce*, 1920; With the Persian Expedition, M. H. Donohoe, 1919.

#### **Dunston.**

Eccles. district and village of Durham, England. It stands

on the Tyne, 2 m. S.W. of Gateshead by the N.E.R. Pop. 9,209.

**Dunvegan.** Sea-loch on the N.W. coast of the Isle of Skye, Scotland, penetrating inland for 7½ m., with a breadth of 2½ m. On the E. shore is Dunvegan Castle, long the seat of the Macleods.

**Dunwich.** Coast parish and village of Suffolk, England. It stands on the North Sea, 4½ m. S.W. of Southwold. The chief town and harbour and at one time the only see of East Anglia, Dunwich has suffered severely from sea encroachments, which at various periods swept away the palaces and houses and blocked up the harbour. The last remains of the ruined church of All Saints fell in 1920. Near by, on the edge of the cliff,

are the ivy-clad ruins of a 13th century Franciscan priory. Pop. 156.

**Duo** (*Ital.*). Music for two voices or instruments. See *Duet*.

**Duodecimal** (*Lat. duodecim, twelve*). System of notation in which twelve is the base. The base of the ordinary scale of notation is ten. Duodecimal arithmetic is sometimes used for computations involving feet and inches. See *Notation*.

#### **Duodecimo**

(*Lat. duodecim, twelfth*). Designation originally applied to a book each sheet of which was folded so as to make

12 leaves. Commonly it will measure 7 ins. by 4½ ins. The word is abbreviated 12mo. or 12°. See *Paper, Sizes of*.

**Dupanloup, FÉLIX ANTOINE PHILIBERT** (1802-78). French bishop. Born near Chambéry, Jan. 3, 1802, he was ordained priest in 1825. He was placed in charge of the



Dunvegan, Isle of Skye. The old castle, seat of the Macleods, seen from the shore

Valentine

Little Seminary at Paris in 1837, and founded the Academy of S. Hyacinthe. He energetically advocated freedom of education, and in 1849 became bishop of Orleans.

He became the leader of the Gallican party against the Ultramontanes, and strongly opposed the definition of the infallibility of the pope, though he submitted to the decree when it was promulgated. He was conspicuous by



Dupanloup



his self-denying labours during the siege of Paris. He died Oct. 11, 1878. He was the author of several works on ecclesiastical and educational subjects, including *La Pacification Religieuse*, 1845; *De l'Éducation*, 1850-62; *La Souveraineté pontificale*, 1860; *Histoire de Jésus-Christ*, 1869. See *Life*, F. Lagrange, Eng. trans. Lady Herbert, 1885.

**Dupin, ANDRÉ MARIE JEAN JACQUES** (1783-1865). French jurist and statesman. Born at Varzy (Nièvre), Feb. 1, 1783, he is usually called the elder, to distinguish him from his two brothers, also eminent lawyers. In 1815, as member of the Chamber of Representatives, he opposed the proclamation of the young king of Rome as emperor. Elected to the Chamber of Deputies in 1826, he assisted in the revolution of 1830, and was made *procureur-général*. In 1832 he was elected president of the Chamber of Deputies, and in 1848 Dupin led the young count of Paris into the Chamber and proposed him for king. He eventually took office under the second empire, declaring that he "belonged to France, not to parties." He wrote several legal works, his *Libertés de l'Église gallicane*, 1824, being condemned by the Congregation of the Index at Rome. He died in Paris, Nov. 10, 1865.

**Dupleix, JOSEPH FRANÇOIS** (1697-1763). French administrator. Born at Landrecies, Jan. 1, 1697, he was the son of a merchant. As a youth he went on voyages to India, where, about 1720, he settled. He was associated with the French East India Co., trading also successfully on his own account. In 1730 he was made governor of Chandernagore, and in 1741 became governor of Pondicherry, and the chief official in French India.

The career of Dupleix in India is that of a great plan thwarted.

He saw the chance of setting up there, by the aid of the natives and their constant rivalries, a great French empire, and he devoted considerable abilities to that end, the scheme including the expulsion of the English. In 1744 war broke out be-

tween Britain and France, and he took vigorous action. Repudiating terms arranged by his colleague, La Bourdonnais, he kept Madras, but failed in an attempt on Fort St. David. Then came the peace of 1748.



Joseph François Dupleix, French administrator  
After Sergent

tween Britain and France, and he took vigorous action. Repudiating terms arranged by his colleague, La Bourdonnais, he kept Madras, but failed in an attempt on Fort St. David. Then came the peace of 1748.

Turning his attention to the Carnatic, Dupleix managed to depose one ruler, and set up another, and within a year his candidates appeared masters, not only of the Carnatic, but also of the Deccan. The appearance of Clive changed the position entirely, the defence of Arcot being the turn of the tide. Unsupported by the officials in France, Dupleix struggled on gallantly for a time, but in 1754 he was recalled to France. He lived in obscurity and poverty until his death, Nov. 10, 1763. See *Clive*: India; consult also Dupleix, G. B. Malleson, 1890; *Life*, J. Biddulph, 1910; Dupleix and Clive, H. Dodwell, 1920.

**Dupont, PIERRE** (1821-70). French poet. Born at Lyons, April 23, 1821, he settled in Paris, and became a contributor of verse to periodicals. His *Deux Anges*, 1842, was crowned by the Academy. But his popularity, wide though transitory, was gained by his songs, many of them political, of which he wrote both words and music. He died at St. Étienne, July 25, 1870. See *Causeries du Lundi*, April 21, 1851. C. A. Sainte Beuve, Eng. trans. E. J. Trechmann, vol. vi, 1909.



Pierre Dupont, French poet

**Duppel.** Village of Slesvig-Holstein. It stands on the mainland, opposite Sonderburg, on the island of Alsens. In 1848 and 1864 the Danes held it against the Germans. In the war of 1848-49 the Danes succeeded in keeping back their foes. In March, 1864, however, the Prussians laid regular siege, the final assault being delivered on April 18. It was successful, and many Danes were taken prisoners.

**Dupplin Moor.** Spot on the Earn, the site of a battle fought Aug. 12, 1332. A party of Scottish nobles, among whom was Edward Baliol, deprived of their estates, took refuge in England. To re-

cover their possessions they sailed from Ravenspur to Kinghorn. The Scots, under the earl of Mar, met them on Dupplin Moor, but their archers did such deadly work that the Scots fell back in disorder. The battle resulted in Baliol's temporary restoration.

**Dupré, JULES** (1812-89). French painter. Born at Nantes, April 5, 1812, he was the son of a potter, who taught him to decorate his wares, but he was otherwise self-taught. His first landscape, a forest scene, was shown at the Salon of 1831, and he then began a lifelong connexion with the Romantic group. His technique is imperfect, but he ranks high among the Barbizon school. He died at L'Isle-Adam, Oct. 6, 1889.

**Dupuy, CHARLES ALEXANDRE** (1851-1923). French politician. B. at Puy, Nov. 5, 1851, he began his career as a teacher, and in 1885 turned his attention to politics. In April, 1893, he became premier in succession to Ribot. The general election in Aug. gave him a large majority, but in Nov. he resigned owing to a difference with President Carnot, and became president of the Chamber of Deputies. In May, 1894, Dupuy returned to power with a cabinet including Poincaré, Delcassé, and Hanotaux. In June Carnot was assassinated, and Casimir-Perier became president. The Dupuy government remained in office, but before the year was ended came the arrest of Dreyfus, and in Jan., 1895, the president's resignation was soon followed by that of Dupuy, after an adverse vote in the Chamber. He was premier a third time, 1898-99, and became a senator in 1900. He was minister of agriculture, of commerce, 1899-1902, and of labour, 1912-14. He died July 23, 1923.



Charles A. Dupuy, French politician

**Dupuy, JEAN** (1844-1919). French journalist and politician. Born at Saint-Palais, Gironde, Oct.

1844, he entered journalism, and from 1888 was director of *Le Petit Parisien*. He was minister of agriculture, 1899-1902, of commerce, 1909-11, and of public works, 1912-13. He died at the close of Dec., 1919.



Jean Dupuy, French journalist



Dupleix. From the statue in Landrecies



**Dupuytren's Contraction.** Condition resulting from chronic inflammation of the palmar fascia, or dense fibrous tissues in the palm of the hand, leading to permanent flexion or bending of the fingers into the palm. It is most often seen in elderly individuals, and is sometimes associated with gout or rheumatism. Continuous pressure on the palm as in using an awl has been suggested as a cause. Surgical measures are the only form of effective treatment. The condition is named after Baron Guillaume Dupuytren (1777-1835), a French surgeon.

**Duquesne.** Borough of Pennsylvania, U.S.A., in Allegheny co. On the Monongahela river, it is 12 m. S.E. of Pittsburgh by the Pennsylvania Rly. It manufactures steel. Settled in 1885, it was incorporated in 1891. Pop. 18,575.

**Duquesne, ABRAHAM, MARQUIS** (1610-88). French sailor. Born at Dieppe, the son of a naval officer,

he entered the merchant service, in which he saw much fighting in the war with Spain and won a high reputation. Peace having been signed with Spain, he obtained a high



Marquis Duquesne, French sailor

position in the Swedish navy, which he led to victory against the Danes near Gothenburg. Again in France, he won glory in 1680 by compelling the surrender of Bordeaux. His greatest successes were his two defeats of the Dutch fleet in 1676—off Stromboli and in the Gulf of Catania, where de Ruyter lost his life. Duquesne died on Feb. 2, 1688.

**Dura Mater** (Lat., hard mother). Dense fibrous membrane which surrounds the brain and spinal cord. It is the outermost of the meninges or three coverings of the brain. See Brain.

**Durance.** River of France. It is formed by the union of three streams that rise in the Alps and unite near Briançon. It then flows in a S.W. direction through the departments of Hautes Alpes and Basses Alpes, afterwards forming the boundary between Vaucluse and Bouches-du-Rhône. It joins the Rhône near Avignon, its length being 220 m. The Durance is used to supply Marseilles with water. A canal extends from the river at Pertuis to the city, 97 m. away.

**Durand, ASHER BROWN** (1796-1886). American painter and engraver. He was born of French parentage at S. Orange, New Jer-

sey, Aug. 21, 1796. Having studied art, he worked in painting portraits, history, genre, and landscape with fair success, and engraved Trumbull's picture The Declaration of Independence. He is known as the founder of the American National Academy. He died Sept. 17, 1886.

**Durand, SIR HENRY MARION** (1812-71). British soldier. Born on Nov. 6, 1812, he was commissioned in the Bengal engineers, and went to India in 1830. He distinguished himself at the capture of Ghazni in the Cabul expedition, 1839, becoming secretary to the governor-general, Lord Ellenborough, 1841-44. Later he held several minor political posts, and, on the outbreak of the Mutiny in 1857 was agent to the court of Holkar at Indore. With only a few troops Durand maintained a foothold in Central India. Member of the council of India, 1859-61, he was on the governor-general's council, 1865-70, becoming major-general in 1867. He died Jan. 1, 1871, shortly after his appointment as lieutenant-governor of the Punjab.

**Durand, SIR HENRY MORTIMER** (1850-1924). British administrator. The second son of Sir Henry Marion Durand, he was born Feb. 14, 1850. Educated at Blackheath and Tonbridge, he was called to the bar at Lincoln's Inn, 1872, and in the following year joined the Bengal Civil Service. In 1879



Sir Mortimer Durand, British administrator  
Elliott & Fry

he served as secretary to Lord Roberts during the Kabul campaign. From 1880-85 he was under-secretary in the foreign department of the government of India; from 1885-94 foreign secretary in India. From 1894-1900 he was British minister at Teheran; 1900-3 ambassador and consul-general at Madrid; and 1903-6

ambassador at Washington. His numerous publications include Lives of Sir Henry Durand, 1883, and Sir George White, V.C., 1915. He died June 8, 1924.

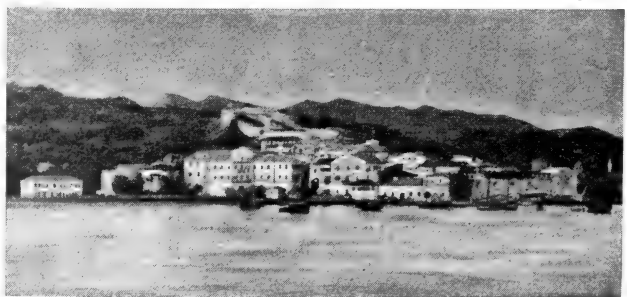
**Durango.** State of N.W. Mexico. It lies S. of the state of Chihuahua, and is mainly mountainous, paralleling the Sierra Madre, which penetrates the W. portion. Agriculture is carried on where possible, and wheat, vegetables, cotton, and sugar are produced. The staple industry is mining, and silver, gold, copper, iron, and other minerals are worked, especially silver. Durango is the capital. Area, 38,000 sq. m. Pop. 509,585.

**Durango.** City of Mexico, the capital of Durango state. Originally called Guadiana, and sometimes known as Ciudad de Victoria, it stands in the Guadiana valley, 570 m. N.W. of Mexico city. The seat of a bishopric, it has a fine cathedral, a government palace, a public library, a college, and other buildings. A flourishing mining and commercial centre, its industrial establishments include cotton, woollen, sugar and flour mills, and foundries. Pop. 34,085.

**Durani.** Name bestowed by Ahmad Shah upon his native Abdali clan when establishing an empire in E. Afghanistan in 1747. It has since become the tribal name of the dominant Afghans. His attempted national fusion by associating Afridi, Mohmand, Orakzai, Yusufzai, and others under the appellation of Bar Durani failed. See Afghan.

**Durazno.** Dept. in Central Uruguay, S. America. It lies between the rivers Yi and Negro. The surface is diversified and the soil fertile; many cattle, sheep, and horses are reared. The capital is San Pedro del Durazno, which is connected by rly. with Montevideo, Paysandu, and Brazil. Area, 5,525 sq. m. Pop. 54,930.

**Durazzo.** Town of Albania, the ancient Dyrrhachium. It stands on the Adriatic, 60 m. S. of Scutari, and is now an inconsiderable place,



Durazzo, Albania. View from the sea showing the landing place and, in the centre, the palace

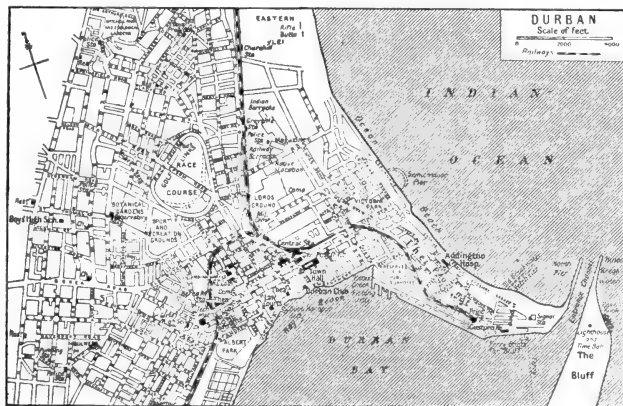
but extensive ruins attest its former greatness. Founded 621 B.C. by Corinthian and Corcyrean colonists under the name of Epidamnus, it was renamed Dyrrhachium by the Romans, who made it the port opposite Brundisium on the W. side of the Adriatic, and later constructed from it the highway across the Balkans to Byzantium. In 1501 it passed to the Turks, who held it until 1913. It is a port whose trade in oil, timber, and fruit is capable of much development. Pop. 5,000.

**Durban.** Commercial capital of Natal, S. Africa. It is situated on the S. shore of a land-locked bay.



Durban arms

Laid out by the Dutch in 1834, it was occupied by the British under Sir Benjamin D'Urban in 1842. There are a fine town hall (opened in 1910), public gardens and parks, racecourse, public library, and museum. It is connected by rly. with Pietermaritzburg and the Transvaal. It is the headquarters of a whaling industry established in 1908. Distance from Southampton, 6,790 m. *via* Cape Town; 8,501 m. *via* Suez. Pop. (whites), 48,475.



Durban. Plan of the commercial capital of Natal, South Africa

**Durbar** (Pers. *dar*, door; *bar*, admittance, court). Term used in India for the court, council, or council chamber of a native ruler, for an official reception or audience, or for a great state ceremony. Specially magnificent durbars were held at Delhi on the proclamation of Queen Victoria as empress of India in 1877 and of Edward VII and George V as emperor in 1903 and 1911 respectively.

**Durchmusterung** (Ger., examination). Name for the modern telescopic star catalogues. Among

the more famous are the Bonn Durchmusterung, which enumerates 324,189 stars (Argelander), and the Cape Durchmusterung (Schönfeld and Gill), comprising 454,875 stars. See Stars.

**Düren.** Town of Germany, in



Durban. Town Hall of the capital of Natal. Above, view of the bay from the promenade

the Rhine prov. It stands on the river Roer, 20 m. E. of Aix-la-Chapelle. Its industries are chiefly textile manufactures, including

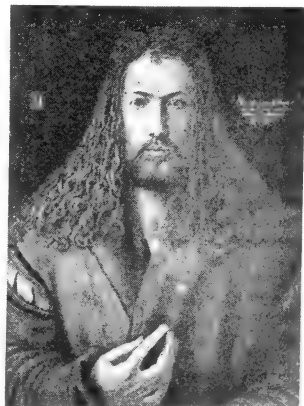
school of Michael Wohlgemuth. In 1490 he set out on a tour abroad. He was at Colmar in 1492, where he made the acquaintance of Martin Schongauer's three brothers, at Basel in 1492-94, and at Strasbourg in 1494. In May, 1494, he returned to Nuremberg, to find that a marriage had been arranged

for him with the daughter of Hans Frey. The marriage was celebrated on July 7, 1494. The story told by Pirkheimer, Dürer's intimate friend, as to the greedy, idle, and passionately jealous disposition of his wife Agnes is neither borne out nor contradicted by Dürer's silence in regard to his married life.

In the winter of 1494-95 Dürer made his first journey to Venice, which appears to have been unfruitful. His second visit was undertaken late in 1505, at the invitation of the Nuremberg merchants established in the city, who

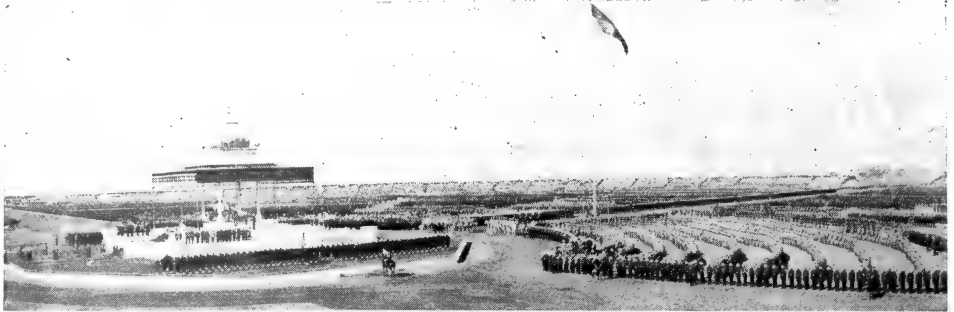
cloth, carpets, etc., but paper and iron goods are also made. It has been a chartered town since about 1300 and was of importance much earlier. It was part of the duchy of Jülich, and became Prussian in 1815. Pop. 32,511.

**Dürer, ALBERT OR ALBRECHT** (1471-1528). German painter and engraver. He was born at Nuremberg, May 20, 1471, the third of eighteen children of a goldsmith, Albert the Elder. He was brought up to the goldsmith's business, but in 1486 was allowed to enter the



Albrecht Dürer

From a self-portrait in the Pinakothek, Munich



Durbar. Central pavilion and throne dais where George V was proclaimed Emperor of India at the Delhi Durbar, Dec. 12, 1911. Within the amphitheatre troops were marshalled in geometrical formation

desired him to take part in the decoration of their bourse, the Fondaco de' Tedeschi. During his sojourn, which lasted till the beginning of 1507, he was cordially received by the nobles, philosophers, and poets; less cordially by the painters, of whom one only, Giovanni Bellini, gave him the hand of friendship. He began in Venice The Feast of the Rosary. On his return to Nuremberg in 1507, he produced the following paintings at short intervals: single figures of Adam and Eve, 1507; The Massacre of Ten Thousand Christians, 1508; The Virgin of the Iris and the Adoration of the Trinity, 1514. Between 1512-19 he was in the service of the emperor Maximilian. In 1520-21 Dürer made a journey to the Netherlands, probably to obtain the continuance by Charles V of the pension granted him by Maximilian. On his return to his home, he devoted himself to unceasing labour until his death on April 6, 1528. He was buried in the graveyard of S. John, Nuremberg, and his house there is now a Dürer museum.

His friend Melanchthon said of the artist that his least merit was his artistic genius; and the friends he attracted to himself, Luther, Melanchthon, and the rest, suggest the attractiveness of his personality and the extent of his culture. On the whole, Dürer was less a painter than a designer; his colour is more truthful to the model than original or beautiful. But in power of design, in nobleness of imagination, in his application of scientific theory to practice, in the introspective quality of his portraits, he has few, if any, equals. As a copper-plate engraver he is supreme; one can only cite the Arms of Death, 1503; the Adam and Eve, 1504; The Great Horse and The Little Horse, 1505; the Knight, Death and the Devil, 1513; St. Jerome in his Chamber, 1514; and the series of The Passion, not to be confused with the woodcuts of The

Great Passion and The Little Passion. His famous woodcuts include the series of The Apocalypse, 1497; the 20 scenes of the Life of the Virgin, 1511; and a number illustrating the writings of Maximilian I. Dürer also published Four Books on Human Proportion, 1528. See illus. pp. 1261, 1872, 1993.

**Bibliography.** Life, W. B. Scott, 1869; Albrecht Dürer, his Life and Works, M. Thausing, Eng. trans. ed. F. A. Eaton, 1882; Literary Remains of A. D., W. M. Conway, 1889; Versuch einer Dürer Bibliographie, H. W. Singer, 1903; Die Kunst Albrecht Dürers, H. Wölfflin, 1905; Albrecht Dürer, Life and a selection of his works, F. Nüchter, Eng. trans. L. D. Williams, 1911.

**Duress** (Lat. *durilia*, hardness). Term used in English law. It means compulsion by means of threats or imprisonment. The court will not allow anyone to retain the advantage of any gift or contract obtained by duress.

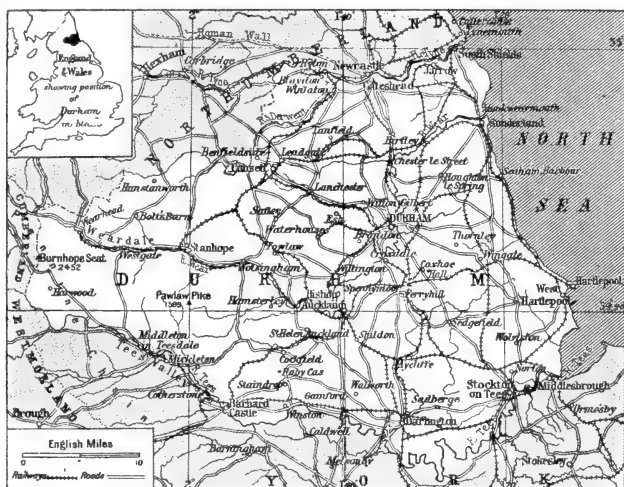
**D'Urfey, THOMAS** (1653-1723). English dramatist and song writer. Born at Exeter of Huguenot ancestry, he soon began to write. His works include both tragedies and comedies, but the latter, which in-

clude The Fond Husband, 1676; Squire Oldsapp, 1679; and Sir Barnaby Whig, 1681, were the most popular. Like other dramatists of his time he was attacked by Jeremy Collier in his Short View of the Immorality of the English Stage. He was also a prolific writer of songs, of which two series were published, entitled New Collection of Songs and Poems, 1683; and Wit and Mirth, or Pills to Purge Melancholy, 1719-20. A man of amicable character, he won the favour successively of Charles I, James II, William and Mary, and Anne, but latterly his vogue as a dramatist declined, and he died in poverty, Feb. 26, 1723. See A Study of the Plays of Thomas D'Urfey, R. S. Forsythe, 1916-17.

**Durham.** County palatine and N.E. county of England. With about 33 m. of coast line, its area is 1,013 sq. m. Branches of the Pennine Chain, the highest summit of which is Burnhope Seat, 2,452 ft., enclose a series of fertile valleys in the W., whence the surface slopes away to the E. Immense coal-measures occupy the centre, the annual production of coal being



Albert Dürer. Examples of the artist's engraving. Left, the Arms of Death, 1503. Right, the Great Horse, 1505



**Durham.** Map of the coal-mining county of north-eastern England, notable also for its shipbuilding, ironworks, and manufacturing industries

nearly 38,000,000 tons. The Wear, Tyne, and Tees, all navigable in part, are the chief rivers, and in their vicinity and the valley districts the soil is arable and well cultivated. In addition to coal, large quantities of lead, iron, limestone, millstone, granite, salt, etc., are obtained.

Durham is noted for horses and shorthorn cattle, and sheep-rearing is carried on. Its manufactures are important, and shipbuilding, sail-making, and the production of chemicals, glass, woollens and earthenware are leading branches; there are also numerous blast furnaces, iron works, and machine shops. The N.E. is the only rly. serving the county.

Durham is the county town, and besides the large shipping ports of Sunderland, Stockton-on-Tees, Jarrow, the Hartlepoons, and South Shields, the largest towns are Gateshead and Darlington. Ten members are returned to Parliament. Pop. 1,478,506. Durham formed part of the kingdom of Northumbria. The regal authority of the



**Durham.** Sanctuary knocker at the cathedral

bishops of Durham was finally withdrawn in 1836.

**LITERARY ASSOCIATIONS.** These start with the Benedictine monastery at Jarrow, founded by Benedict Biscop, but its greatest name is that of the Venerable Bede (q.v.), who was born near Wear-

mouth. Richard de Bury, author of *Philobiblon*, and bishop of Durham, died at Auckland and was buried in Durham Cathedral. At Stanhope, in Weardale, Joseph Butler, its rector, wrote *The Analogy of Religion*. Joseph Ritson, the antiquarian writer, was born at Stockton, and Elizabeth Barrett Browning at Coxhoe Hall, near Durham. Scott's *Rocheby* has much about Barnard Castle and the upper Tees valley.

**Bibliography.** *The County Palatine of Durham: a Study in Constitutional History*, G. T. Lapsley, 1900; *Victoria Hist. of the County of Durham*, ed. W. Page, 1905-7; *Hist. and Antiquities of the County Palatine of Durham*, R. Surtees (1816-40), repr. 1908, etc.; *Memorials of Old Durham*, ed. H. R. Leighton, 1910; Durham, J. E. Hodgkin, 1913.

**Durham.** City, mun. borough, and county town of Durham, England. It stands on the Wear, 287 m. from London, and has a



**Durham.** The cathedral, seen from across the River Wear. The lancet and perpendicular work of the two western towers, and that of the central tower, is imposed upon the original Norman architecture, among the finest of its period in England

Photochrom

station on the N.E. Rly. The older part of the city is on and about a hill round which the river bends; the newer parts are on the other side of this.

The glory of Durham is the cathedral, and near it, on the river peninsula, is the castle. The present cathedral, which replaced an older one, was begun in the 11th century, and much of it is Norman; this includes the nave and the restored chapter house. The Galilee chapel (*q.v.*) is a notable feature, as are the central tower and the chapel of the nine altars. There are a valuable



Durham city arms

library and some relics of S. Cuthbert. The cloisters and other parts of the monastic buildings still exist. The first castle was built by William the Conqueror, but little of this remains. Much of the present building, which is the headquarters of the university, is old, and some portions are highly interesting.

Other objects of interest in the city are some of the churches and the bridges across the Wear, especially Framwellgate, of the 14th century. Elvet Bridge, leading to the suburb of Elvet, is also old, and on it are still a few houses. The churches include S. Margaret's, S. Oswald's, S. Mary le Bow, S. Mary the Less, and S. Giles. The town hall dates from the 16th century. The grammar school is an old foundation; its present house dates from 1844. At Ushaw is the Roman Catholic college of S. Cuthbert.

The city lives largely on the business brought by the presence of a cathedral, a university, and the county headquarters. It has some other industries, including the manufacture of iron, and there are many coal mines in the neighbourhood. It has been a chartered town since 1179, and is governed by a mayor and corporation. It was represented in Parliament by two members from 1673 to 1885. The number was reduced to one in 1885, and in 1918 the representation was merged in that of the county.

The city owes its origin to the monks of Lindisfarne, who, looking for a place of safety, considered this to be such, and settled here in 995 with the bones of S. Cuthbert. A church was built which became a cathedral, the bishopric being removed hither from Lindisfarne. Market day, Sat. Pop. 17,329.

**Durham, UNIVERSITY OF.** Founded in 1832, its constitution was modified in 1908, when it was



Durham University arms

leges being mainly occupied with preparing candidates for the Anglican ministry. These are University College, and three halls—Bishop Hatfield's, S. John's, and S. Chad's—and the dean and chapter of Durham are the governors. There is also a hostel for women students, and women are admitted to all the courses and degrees except the theological. The Newcastle division consists of Armstrong College and the College of Medicine. The former, until 1904 called Durham University College, was founded in 1874; the latter dates from 1832, and was united with the university in 1852.

The university has seven faculties—arts, letters, theology, law, medicine, science, and commerce. Science and commerce are taught exclusively at Armstrong College, which also grants diplomas in engineering, naval architecture, agriculture, and mining. It has land at Chopwell for instruction in forestry, and two stations, Cocol Park and Offerton Hall, for agricultural research, as well as a marine biological station at Cullercoats. At Durham residence is necessary in order to qualify for a degree, but not at Newcastle. Before the Great War the university had about 200 students at Durham and about 1,700, day and evening, at Newcastle. Codrington College, Barbados, is affiliated with Durham.

**Durham.** City of North Carolina, U.S.A., the co. seat of Durham co. It is 26 m. N.W. of Raleigh on the Southern and other rlys. The seat of Trinity College, founded 1851, it has schools of art and music, a public library, and hospitals. A busy centre of the tobacco industry, it contains also foundries, cotton mills, and a fertiliser factory. Incorporated in 1869, it became a city 30 years later. Pop. 26,160.

**Durham, EARL OF.** British title borne since 1833 by the family of Lambton. The Lambtons had lands in Durham as early as the 12th century, but they remained commoners until the time of John George Lambton, who, having made a reputation as a statesman and administrator, was made Baron Durham in 1828, and Viscount Lambton and earl of Dur-

ham in 1833. His grandson, John George (b. 1855), who became the 3rd earl in 1879, is a K.G. and a patron of the turf. His twin brother, F. W. Lambton, was a Liberal M.P. from 1880–85, and a Unionist M.P. from 1900 to 1910; another brother, Hedworth, who distinguished himself at the siege of Ladysmith, took under a will the name of Meux (*q.v.*). The earl's seat is Lambton Castle, Durham.

**Durham, JOHN GEORGE LAMBTON, 1ST EARL OF (1792–1840).** British statesman. Born April 12, 1792, he was the son of William H. Lambton of Lambton Castle, Durham, to whose estate he succeeded when only a child. From Eton he entered the army, but forsook that service for politics, becoming an M.P. for the county of Durham in 1813.



*Durham*  
After Lawrence

Prominent among the Whigs, to which party his family had been long attached, he advocated parliamentary reform and other changes. His enthusiasm as a reformer earned for him the name of Radical Jack.

In 1828 Lambton was made a peer, and in 1830 he entered Grey's Cabinet as lord privy seal. He had a large share in drafting the Reform Bill of 1832 and in the negotiations that preceded its passage into law. In 1833, differing from several of his colleagues, especially Brougham, he left office, but still held a very strong position in the country. For two years he was ambassador at St. Petersburg (1835–37), and then went as governor-general to Canada, after the rebellion of 1837. It is with his work there that his name is chiefly associated. He was armed with unusual powers, which he exercised freely, but the result was hardly satisfactory. Brougham attacked him for sending eight rebels to Bermuda, and Parliament decided that the step was illegal. Unsupported by the cabinet, Durham had no course but to resign. He defended himself in a public proclamation, and returned to England.

Durham then prepared his famous Report on the Affairs of British North America (1839), described as "one of the greatest state papers in the English language," and certainly one of the most influential. Therein he advised the union of the two Canadas, responsible government, the building



of an intercolonial rly. and other liberal measures afterwards approved and carried out. He died at Cowes, July 23, 1840. In 1833 he had been made an earl, and his successor was his son, George. See Life and Letters, S. J. Reid, 1906.

**Durham Light Infantry.** British regiment, of which the two battalions were formerly the 68th



and 106th regiments of light infantry. The former was raised in 1756 as a 2nd battalion of the 23rd regiment, becoming the Durham Light Infantry in 1758. Organized as a light infantry regiment in 1808, it was called the 1st battalion Durham Light Infantry in 1881. The battalion fought in the West Indies in 1761, and was granted the motto "Faithful" for its services against the natives in St. Vincent. It took part in the ill-fated Walcheren expedition (1809), in the Spanish campaign of 1811, in which it earned distinction at Salamanca and Vittoria, and in the Crimean War it fought at Alma and Inkerman.

The 2nd battalion, raised in 1826, served in the Mahratta War, 1844, and the Persian War (1856). Other important services include the Maori campaign, the Egyptian War, 1885, and the South African War (Colenso, Spion Kop, Pieter's Hill). During the Great War the 1st battalion remained in India in 1914, and the 2nd arrived in France while the battle of the Aisne was in progress, Sept., 1914. The 8th Durhams formed part of a division of northern Territorials, and were present at the second battle of Ypres, April, 1915. Some Durhams waged another desperate fight around the Butte of Warlencourt in Oct., 1916, where a memorial has been erected to their honour; and Durhams formed part of the force which made a gallant stand to save Merville in April, 1918. The depot is at Newcastle-on-Tyne.

**Durian** (*Durio zibethinus*). Large evergreen tree of the natural order Malvaceae. It is a native of Malaya and the Indian Archipelago. The prickly fruit, as large as a man's head, is greatly esteemed by the Malays and Chinese, but for Europeans it is an acquired taste. At the right point of ripeness it is a sort of vegetable custard, and equal to the finest of nectarines and pears. But it has an indescribable odour which fills many with

disgust, though its flavour is most tempting to the palate.

**Durra.** Name for the seeds of Indian millet (*q.v.*) or Guinea corn.

**Dursley.** Parish and market town of Gloucestershire, England. It is 15 m. S.S.W. of Gloucester by the Mid. Rly., at the foot of the scarp of the Cotswolds. Cycles are manufactured and bath-stone is quarried. Pop. 2,601.

**Duruy, JEAN VICTOR** (1811-94). French historian and academician. Born in Paris, Sept. 11, 1811, he became successively master at the École Normale and professor at the École Polytechnique. In 1863-69 he was minister of public instruction. His works include histories of France and Greece and a monumental *Histoire des Romains*, 7 vols., 1879-85. He died Nov. 25, 1894. See Life (in French), E. Lavis, 1895.

**D'Urville Sea.** Portion of the Antarctic Ocean. It lies off Adélie Land, on the Antarctic Circle of Mertz Glacier, and contains Commonwealth Bay. It was named after the French explorer, Dumont d'Urville (1790-1842), by the Mawson Antarctic Expedition, 1911-14.

**Dury.** Village of France. It is on the Arras-Cambrai road in dept. of Pas-de-Calais, about midway between Drocourt and Quéant. The village and hill commanding the Arras-Cambrai road were captured by Canadians, Sept. 2, 1918. There is another village of this name about 1½ m. S. of Amiens, in the dept. of Somme. See Arras, Fifth Battle of.

**Duse, ELEONORA** (1859-1924). Italian actress, born near Venice. Oct. 3, 1859. Her parents belonged to a travelling company.



Eleonora Duse, Italian actress

From the age of four, when she appeared in *Les Misérables*, she played in various juvenile parts. Her first success came at Turin, 1879, and in 1882 she was a leading player in Rossi's company, winning at Florence further success as Frou-Frou. As Marguerite Gautier in *La Dame aux Camélias* at Rome, 1883, she was recognized as one of the greatest living actresses, a reputation confirmed by her subsequent performances at Vienna and Berlin, London, and New York. Her finest impersonations

included Magda, *La Tosca*, *San-tuzza* in *Cavalleria Rusticana*, *Mirandolina* in *La Locandiera*, *Paula* in *The Second Mrs. Tanqueray*, *Nora* in *A Doll's House*, and heroines in *D'Annunzio's* dramas. She died April 21, 1924.

**Dusius.** Demon among the ancient Gauls mentioned by S. Augustine. It was suggested by John Brand (1744-1806), in his *Observations on Popular Antiquities*, that the exclamation, *Deuce*, commonly accepted as signifying the devil, is really derived from the name of this Dusius. See Demonology.

**Dussek, JOHANN LADISLAUS** (1761-1812). Bohemian pianist and composer. Born at Czeslau, Feb. 9, 1761, the son of a musician, he studied music at Iglau and Prague and gained a great reputation as pianist, composer, and teacher. He was successively organist at Mechlín, Bergen-op-Zoom, and Amsterdam. After 1786 he was a fashionable pianist and teacher in Paris, and from 1790 to 1800 in London, which he left to avoid his creditors. He was afterwards in the suite of a Prussian prince and later in that of Talleyrand. He died March 20, 1812. The playing of Dussek was distinguished by its beauty of tone, and he was a prolific composer of piano music. *Pron.* Dooshek.

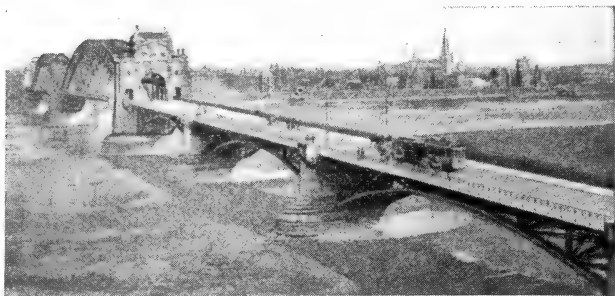
**Düsseldorf.** City and district of Germany, in the Rhine prov. It stands in the centre of a plain, at the



Düsseldorf arms

confluence of the Rhine and Düsseldorf, at the junction of several rlys., 24 m. by rly. N.W. of Cologne. A promenade between the fine Rhine bridge (1896-98) and the harbour was completed in 1902. The narrow, irregular streets of the old town, which is separated from the new by the broad Alleestrasse, with statues of Wilhelm I, Bismarck, and Moltke, contrast with the open and picturesque aspect of the new, with its broad and tree-lined avenues and squares. The old electoral palace, once the home of the Academy of Art, was almost destroyed by fire in 1872. The Gothic-Renaissance Rathaus, 1570-73, was extended in 1885. In front of it is Gruppello's bronze equestrian statue of the elector Johann Wilhelm, erected 1711. Notable among the 37 churches, two-thirds of which are Roman Catholic, are S. Lambert, 14th century Gothic; S. Andrew, 1629, once the church of the court and of the Jesuits; and S. Roche. The Hofgarten, 1769,





Dusseldorf. The town seen from the left bank of the Rhine, where it is spanned by the bridge built in 1896-98

extended 1804-13, whose Castle Court was immortalised by Heine, is one of several delightful pleasure grounds; another is the Kaiser Wilhelm Park.

There are many educational institutions, industrial and historical museums, a public library, a municipal theatre, palace of justice, post office, banks, hospitals, and a cemetery. The Academy of Art, a famous school of *genre* painters, founded by the elector Charles Theodore, 1767, is housed in a Renaissance building, 1879, with lecture hall. The greater part of the collection of old masters in the original picture gallery, founded by the elector Johann Wilhelm, was removed to Munich in 1805. The Düsseldorf art school flourished 1820-40 under Peter Cornelius and W. Schadow. The Kunsthalle or municipal art gallery, 1881, enlarged 1902, with frescoed staircase, is devoted to modern work. Of recent years Düsseldorf has developed large iron, textile, brewing, distilling, printing, dyeing, and other industries, and has become an important banking centre. Gas, waterworks, tramways, and electric plant belong to the municipality.

\*First mentioned in 1159, Düsseldorf received municipal rights in 1288. Early in the 16th century it was the residence of the dukes of Berg, and from 1609-1716 that of the princes palatine. In 1795 it became French and in 1815 was annexed to Prussia. It was in the neutral zone after the Great War. In the town were born the painters Cornelius and Schadow, the philosopher Friedrich H. Jacobi, and the poet Heine. Pop. 360,000.

**Dust.** Fine dry particles of matter. Dust is of great importance, a fact which, however, has only been fully recognized within recent years. Without the presence of dust in the atmosphere, for example, there would be no cloud formations. John Aitken showed (1880) that the particles of dust in the atmosphere act as centres of

condensation for the formation of rain drops. Without dust the atmosphere would reach a higher state of saturation than now holds, resulting in the condensation of water on buildings, trees, etc., and on the clothing, as in mists.

Atmospheric dust particles are so small that the microscope has failed to distinguish many of them, and Aitken invented an instrument, known as the dust counter, for estimating the amount of dust in a given volume of air. Large cities show a heavy amount compared with country districts, while the air of mountain districts is freest from dust, particularly the Highlands of Scotland. But on Ben Nevis over 14,000 particles of dust per cubic centimetre have been recorded, and over a quarter of a million in big cities.

Volcanic dust is composed of minute mineral fragments ejected during volcanic eruptions. Sometimes called ash, it comprises the pulverised forms both of lava and of sedimentary rock dislodged from vent-walls. The distance from the originating centre at which any particle settles on land or sea is determined by the relation of its mass and maximum elevation to the force and duration of the wind.

Dust from the great Iceland eruption of 1783 destroyed the crops in Caithness, Scotland. After the eruption of Soufrière, St. Vincent, in 1812, 3,000,000 tons of "May dust" fell 100 m. away on Barbados. The Tomboro eruption in Sumbawa, 1815, distributed 50 cubic m. of material—185 times the mass of Vesuvius—over 1,000,000 sq. m. The most impalpable particles may float in the upper air for long periods, being indeed a predominant source of atmospheric dust everywhere. At Krakatoa, Malay archipelago, Aug. 26-27, 1883, the dust-column, rising to 30 m., caused darkness for 150 m. around. Some of it completed the circuit of the earth in 15 days, and remained floating at high ele-

vations for three years in a belt between 60° N. and 10° S., producing remarkable sunsets seen in all parts of the world.

Vast areas in Nebraska and Kansas, U.S.A., are covered with ancient volcanic dust up to 30 ft. thick. When such deposits, formed in geological time, are subsequently consolidated, they are called tuffs. Submarine eruptions are attended by similar phenomena, producing volcanic muds.

The inhaling of dust is responsible for chronic disease of the lungs and air passages, increasing susceptibility to tuberculosis. Those most frequently affected are miners, quarrymen, earthenware and pottery manufacturers, cutlers, file makers, etc. The evil is reduced to a minimum by efficient ventilation, the use of hoods which prevent the dust from rising to the worker, or outlet shafts which draw it away as formed. In some processes it is possible to keep the dust down by sprinkling with water.

**Dust-Storm.** Wind-current of great velocity, laden with minute solid particles. The distance to which dust derived from the desiccated surface of exposed soil is transported is determined by the force and duration of the wind. The local air-eddies which raise "March dust" are dust-storms in miniature. They especially characterise the dry desert-winds of wide, arid regions. The result of dust-laden wind-drift long continued is seen in such deposits as the clayey loess, sometimes 2,000 ft. thick, of N. China.

In central Asia the noonday sun is often obscured by fine, yellow loess-dust. On April 2, 1892, a dust-cloud, mostly of loess felspar, covered 2,000 m., and was driven 400 m. out into the China Sea. The Sahara is another potent breeding ground of dust-storms, called in Egypt the khamsin, in the Mediterranean the sirocco, in Madeira the leste, in Guinea the harmattan, in W. Asia the simoom. It causes dry, red fogs off the W. African coast; when rain falls through them, so-called blood-rain results. A storm of March 9-12, 1901, transported 1,800,000 tons of fine Saharan dust across Europe towards Russia.

**Dusun.** Primitive people of Indonesian stock living in N. Borneo. Estimated (1911) at 88,000, they form an important part of the Murut group. They have absorbed an immigrant Chinese strain, and adopted buffalo drawn ploughs and systematic irrigation. Tall, slender, long-headed, they are darker than the land Dyak of the Klemantan group.

## DUTCH ART: SURVEY AND APPRECIATION

C. Lewis Hind, Author of *Lives of Rembrandt, Velasquez, etc.*

*The art of most of the countries of the world is described under the country, e.g. France; Germany; Italy; but this is an exception. Further information is given in the biographies of the great masters, Hals and others. See also Art; Greece: Art; Rome: Art, etc.*

In the 15th and 16th centuries a few great painters arose in the Netherlands, who are ranked to-day with some of the best Italian masters. The pre-eminence of such early Netherlandish artists as Dirk Bouts, Gerard of Haarlem, and "Peasant" Brueghel is unquestioned; but it is not easy to say which of these masters are Hollanders and which are Flemings. The modern kingdom of Holland, as a monarchical state, dates from 1814, and by then the flowering time of Dutch art was over.

The great period began with the 17th century, and extended through it, masters following one another in bewildering profusion. Not all were great painters, but the majority were extremely competent craftsmen, and were quite content to practise their art modestly, and for small remuneration. No Dutch painter fraternised with princes, as Titian, Raphael, and Leonardo did. Hobbema, whose Avenue at Middleham is in the National Gallery, London, was the last of the Dutch 17th century masters, and, like many of the others, he died a pauper.

The 18th century did not produce one Dutch painter of eminence; but in the 19th the genius of Holland again flowered forth. In Jacob Maris (1837-99) landscape painting reached a height of sensitiveness and beauty that has never been excelled. Holland has rightly been called Landscape Land, and no one has interpreted the pearly light and moist atmosphere better than Jacob Maris.

### The Star of Frans Hals

In the history of art certain nations have taken the lead in turn. Italy was the pioneer, and her great masters are still unapproachable; but when the star of Frans Hals, the first great light of that wonderful 17th century in Holland, rose, Italian art had quite spent itself. Raphael had been dead 60 years when Frans Hals was born in 1580.

Dutch art derived nothing from Italy. The materials of painting were similar, but the outlook was entirely different. In Italy art was the handmaid of the church and of the wealthy noble. In Holland art served the people, and ministered to the pride of the bourgeois in his country, his houses and possessions. Art was a family affair. The homely Dutchman painted his home, was quite in-

different to ideal subjects; he never attempted mythological, heroic, or religious themes. Dirk Bouts, Gerard of Haarlem, and Gerard David in the 15th century had painted religious pictures; but in the 17th hardly a Dutch painter ever thought of choosing a religious subject. Rembrandt was the exception, but his pictures dealing with sacred themes were spiritual rather than religious. Such masterpiece as S. Matthew Inspired by an Angel, and The Pilgrims at Emmaus, were painted from his heart. They taught no dogma. They were the personal expression of his spiritual emotion, not, as in Italy, a statement commissioned by the Church. The same may be said of his etchings and drawings of religious subjects.

### Dutch National Spirit

Holland produced an everyday homely art, which attained, at its best, such exquisite craftsmanship that, in their particular *métier* these Dutch pictures are unrivalled. There was good reason for this love of country, and the Dutchman's desire to laud it in pictures. This unpretentious patriotism began when the disastrous war with Spain ended with the truce of 1609, and the dogged, strenuous citizens had time and opportunity to realize their aspirations after a national life. As their churches were plain and unadorned, they lavished their passion for beautiful things upon their homes, which was followed by a desire to have pictures of those prosperous interiors; so arose the *genre* or home picture. With the demand came the supply from such masters as Vermeer of Delft, Terburg, de Hoogh, Metsu, Jan Steen, and numerous lesser masters. These home pictures ranged from such exquisite performances, where in light is the principal subject of the picture, as Vermeer's Young Lady at a Spinnet, and de Hoogh's Courtyard of a Dutch House, to the village inn scenes of Jan Steen and Brouwer, coarse according to our standards. But Jan Steen (1626-79) could also paint beautiful and restrained interiors, as in his Grace before Meat in the National Gallery, London, and his Sick Girl at Amsterdam.

The burghers in their fine clothes also desired portraits of themselves, and of their wives and children. The Civic Guards and

Companies of Archers were equally eager to be commemorated: so arose the *doelen* pictures, groups of men banqueting, or in conclave, which may be seen in profusion in the Ryks Museum at Amsterdam. Rembrandt was among those who were commissioned to paint *doelen* pictures, and they were the initial cause of his financial disaster. His patrons wanted likenesses of themselves. He gave them a work of art. So disputes arose, then the cold shoulder, and Rembrandt, withdrawing more and more into himself, became Rembrandt the great artist.

There was the beautiful, placid country which the Dutchman had wrested with such labour from the sea, and from the heel of the conqueror. That also had to be portrayed; hence arose the school of Dutch landscape painters of which the chief masters were Jacob Ruisdal, Cuyp, and Hobbema.

Among this galaxy of 17th century painters four stand out pre-eminent—Rembrandt (1607-69), the greatest artist in paint the world has known; Frans Hals (1580-1666), whose portraits and *doelen* pictures have a vivacity and mastery of technique which places him in a class by himself; Jacob Ruisdal (1625-82), the most profound of Dutch landscape painters; and Vermeer of Delft (1632-75), who, as a painter of the subtleties of light in portraiture, *genre*, and landscape, ranks among the greatest craftsmen of the world.

Frans Hals, the first purely Dutch painter of eminence, is not adequately represented in the National Gallery of London; a journey to Haarlem is necessary to see him in his full power. His last works, painted when he was an old man, have a depth of vision and a fluency of technique that are more astonishing each time they are seen.

### Atmosphere and Landscape

The name of Hercules Segers has lately come into prominence, due mainly to the researches of Dr. Bode, of Berlin. He was a leader in landscape painting; he originated the "bird's-eye view," and Rembrandt, who missed nothing, learnt from Segers, and acquired his pictures. Van Goyen was an early tone painter. Timidly but tenaciously he introduced atmosphere into landscape. Terburg (1617-81) is represented in the National Gallery, London, by his beautiful Guitar Lesson, and by his wonderful little representation of The Peace of Münster. Cuyp (1620-91) has won the heart of the world by the golden glow of his landscapes. The skies of J. Van de Capelle (c. 1624-79) (see the pair of Capelles in the National Gallery, London)



Dutch Art. The Laughing Cavalier, one of the best known works of Frans Hals (1580-1666)

Wallace Collection

are the despair of many modern artists. Paul Potter (1625-54) is famous for one of his lesser important pictures, *The Bull*. Jacob Ruysdael shows such a magisterial feeling in his work that one can look at almost any one of his landscapes and say "a masterpiece." The same can be said of Vermeer of Delft. Two of his pictures may be mentioned—the portrait of an Artist at Work, supposed to be himself, in the Czernin collection at Vienna, and his *View of Delft* in the Hague Museum. With Hobbema (1638-1709) we reach the end of the 17th century galaxy of stars in the Dutch firmament.

In the 18th century Dutch art merely glimmers. We are grateful for the flowers and fruits of Van Huysman and Van Os. The epitaph of Paul La Fargue, and of 18th century Holland, is written in a sentence: "Paul La Fargue copied the older Dutchmen."

In the 19th century a new life sprang from the soil with Bosboom (1817-91), and with Jongkind, who has been aptly described as

the link between Romanticism and Impressionism. J. H. Weisenbruch, true to the traditions of Landscape Land, painted the moist air and the veiled sunlight with the lightest of hands. The

sad and weary art of Israëls (1824-1911) is sometimes significant; but he fumbled overmuch. Mesdag (1831-1915) was greater as a connoisseur and influence than as a painter. Mauve had a frank, fresh, and delicate talent; but the three chief figures in modern Dutch art are the brothers Maris—Jacob (1837-99), Matthew (1839-1917), and William (1843-1910). For pearly light, and fresh colour, the landscapes of Jacob Maris have never been excelled, and Matthew Maris is one of the very few modern artists who deserve the title of mystical painter. Bloomers, Breitner, and Bauer have all won European reputation; but their reputation pales beside that of Vincent van Gogh, who died in 1906. During the last decade Van Gogh has been more discussed, with approbation and disapprobation, than any other painter. He and the Frenchmen, Cézanne and Gauguin, have been docketed as leaders of the Post-Impressionist movement, and certainly the work of Van Gogh has been a great influence among the young painters of the 20th century. Lastly, mention must be made of Louis Raemaekers (b. 1869), whose war cartoons, in fertility of invention and in range of satire, have been the chief pictorial commentary on the Great War. There must be great vitality and an astonishing power to meet new conditions in a country which, in the 17th century, can produce a Vermeer of Delft and a Pieter de Hoogh, and in the 20th a Vincent van Gogh and a Louis Raemaekers.

*Bibliography.* Frans Hals, G. S. Davies, 1904; *The National Gallery*, G. Geffroy, 1904; *The Complete Work of Rembrandt*, W. von Bode and C. H. de Groot, Eng. trans. F.



Dutch Art. One of Rembrandt's masterpieces, *The Syndics of the Guild of Clothmakers*, painted 1662

Rijks Museum, Amsterdam

Simmonds, 1897-1906; Vermeer de Delft, G. Vanzype, 1808 (in French); Great Masters of Dutch and Flemish Painting, W. von Bode, Eng. trans. M. L. Clarke, 1909; Hist. of Painting, Haldane Macfall, vol. v, 1911.

**Dutch Auction.** Auction at which the property is offered at a price higher than the seller will accept. The price is lowered until a purchaser bids, when the lot is at once knocked down, or sold, to him at the sum last mentioned by the salesman. See Auctioneering.

**Dutch Church, THE.** Name given to the predominant Protestant Church in Holland. Holland was the first country in Europe to accept the principle of toleration for all forms of religion, and to subsidise out of the state funds all religious denominations willing to accept its bounty. At the time of the Reformation, Protestantism assumed the form of what is known to-day as The Reformed Church. From 1648 to 1795 it was recognized as the state church of Holland.

After the Revolution all churches received equal recognition, but the Reformed Church never lost its prestige and is still recognized as



**Dutch Art.** *The Anxious Family* by Josef Israels (1824-1911), a good example of the domestic spirit in the modern Dutch school of painting

*From a private collection*

the Confession of Faith of the Synod of Dort, 1619.

The Dutch Church has about

root in America. The earliest Dutch settlers in America carried with them the religious principles of the Reformed Church which had been founded in Holland after the Reformation, and a church was organized in 1628, gradually strengthened by the stream of immigrants.

The church was at first supplied with ministers from Holland, and was regarded as forming part of the Presbytery of Amsterdam. In the following century, however, the American Church sought and with some difficulty obtained its independence and its right to educate and ordain its own ministry. Some secessions took place as the result of the new policy, but the breach was subsequently healed, and in 1812 a constitution was adopted which still remains in force. In its polity the American Church adopted the Presbyterian mode of Church government used in the mother church in Holland (with some minor modifications), with its consistory for the local church, its presbytery or *classis* for the district, and its synod for the province. The doctrinal basis of the church is strongly conservative and Calvinistic, being based on no less than five creeds: the Apostles', the Nicene, the *Quicumque Vult*, the Belgic Confession (1561), and the canons of Dort (1618-19). The Heidelberg Catechism (1560) is used as a manual of doctrine, and acceptance of its statement is required of all seeking for Church membership. The Dutch Reformed Church has about 800 churches, chiefly in the states of New York and New Jersey, and about 125,000 members.



**Dutch Art.** *The Port of Amsterdam*, by Jacob Maris (1837-99). The picture's soft, warm colouring is characteristic of his work

*National Collection, The Hague*

the predominant Protestant church of Holland. The constitution of the Dutch Church is based on the Presbyterian model. Each local congregation is governed by a consistory composed of deacons and elders. The local churches are grouped into 148 circuits and 44 *classes* or presbyteries. From these 10 provincial synods are formed, and in addition there is a general synod representing the whole country composed of 19 members, which acts as a final court of appeal. The theology of the Dutch Church has always been Calvinistic, and its credal basis is

two million members in Holland itself, and its influence in the Dutch colonies and in South Africa is very extensive. At different periods in its history there have been schismatic movements formed to emphasise some principle of theology or Church government which had seemed to fall into neglect. Thus the Christian Reformed Church was started in the third decade of the 19th century to protest against the growing laxity in the treatment of the creed.

**DUTCH REFORMED CHURCH.** Name given to the particular form of the Dutch Church which has taken

**Dutch Liquid** or ETHYLENE DICHLORIDE ( $C_2H_2Cl_2$ ). Thin oily liquid with a sweetish taste and pleasant smell. Discovered in 1795 by four Dutch chemists, it is prepared by passing ethylene into a warm mixture of manganese dioxide, salt, water, and sulphuric acid until the black colour of the manganese has disappeared, and then distilling off the ethylene dichloride. It can be made from coal-gas, is obtained as a by-product in the manufacture of chloral, and is used as an anæsthetic.

**Dutch Metal.** Alloy of copper and zinc, and therefore technically a brass. The proportion of the copper may range from 77.75 to 84.5 p.c. The colour varies from a pleasing pale yellow to a dark yellow, according to the proportions used. It is a very ductile metal and much used in the preparation of Dutch gold leaf, which is made by rolling down small cast bars to ribbon, beating under a steam hammer to a certain thinness, annealing, pickling in dilute sulphuric acid, boiling in solution of argol, washing and drying, and then beating with hand hammers, as in the manufacture of gold leaf proper. Dutch leaf is largely used for gilding purposes, being much cheaper than gold; while its colour may be preserved for a long time by painting with transparent lacquer. The colour is sometimes changed to red, violet, or green, or other shade by adding to the lacquer a small quantity of pure aniline dye. See Alloy; Brass.

**Dutch New Guinea.** Possession of Holland, included in the Dutch East Indies. See New Guinea.

**Dutt, MICHAEL** (1824-73). Bengali poet and dramatist, properly Madhu Sudan Datta. Born at Sagandari village, Jessore district, Bengal, he was sent to the Hindu College, Calcutta, at the age of 13. Six years later, objecting to a marriage that was being arranged for him, he ran away, forsook his caste, and became a Christian. He then completed his education with four years at the Bishop's College. His first book, *The Captive Lady* (1849), in English verse, though containing much that was remarkable in one writing in a foreign tongue, was less notable than his subsequent poetry written in Bengali. His *Sermista* (1858) and *Ratnavali* (1859) are the first examples of classical and regular drama in Bengali. Of both of these he made English translations.

His other poems include two great epics in blank verse, *Tillottama* (1860) and *Meghanad badh Kavya* (1861), the latter being described by a compatriot critic (R. C. Dutt) as

the greatest literary production of its century. His name has become a household word among the people of Bengal, and he is by common consent regarded as the chief master in modern Bengali literature. He travelled in Europe, 1862-67, and died June 29, 1873. See *The Literature of Bengal*, R. C. Dutt, 2nd ed. 1895.

**Dutt, ROMESH CHUNDER** (1848-1909). Indian statesman and author. Born in Calcutta, Aug. 13, 1848, and educated at the Presidency College, Calcutta, and University College, London, he was called to the bar at the Middle Temple, 1871. A member of the Indian Civil Service, 1871-97, he held office as a divisional commissioner, 1894 and 1895; and was a fellow of Calcutta university. He became revenue minister, 1904-7, and prime minister, 1909, of Baroda. Made a C.I.E. in 1892 for his administrative and literary work, he was author of a *History of Civilization in Ancient India*, 1889-90; condensations in English verse of the *Mahabharata* (1899) and *Ramayana* (1900); books on the economic history of India; and a number of historical and social novels in Bengali. He died Nov. 30, 1909. See *Life and Work*, J. N. Gupta, 1911.

**Duval, CLAUDE** (1643-70). Highwayman, born at Domfront, in Normandy. He came to England at the Restoration in the train of the duke of Richmond, took to the road, and became notorious for his daring robberies and for his gallantry. He was captured while drunk in a London tavern and executed at Tyburn. He was buried in Covent Garden Church. Duval is the subject of a well-known picture by W. P. Frith.

**Duven, SIR JOSEPH JOEL** (1843-1908). Anglo-Dutch art dealer. Born in Holland of Dutch parentage, he started as an antique dealer in Hull in 1865. In 1877, with his brother Henry, he founded in New York the art-dealing firm bearing their name. Opening in London in 1879, the firm quickly became noted for its discrimination and ability, among its famous purchases being the Kahn collection of old masters for nearly £2,000,000. Duven presented the Turner wing to the Tate Gallery (opened 1910), and many works of art to the national collections, and was knighted in 1908. He died at Hyères, Nov. 9, 1908.

**Duvevriyer, HENRI** (1840-92). French explorer and geographer. Born in Paris, Feb. 28, 1840, he travelled in the desert hinterland of Algeria and Tunis, reaching as far S. as El-Golea and Ghadames

(1859-61). This exploration work secured his appointment, in 1867, as secretary of the Société de Géographie. In 1874 he resumed his exploration of French N. Africa. His published works include *Exploration du Sahara: les Touareg du Nord*, 1864; *La Tunisie*, 1881; *Le Transsaharien*, 1889-90; *Sahara algérien et tunisien*, 1905. He died April 25, 1892.

**Dux** (Lat., leader). Word sometimes used, especially in Scotland, for the head boy of a school.

**Dux.** Town of Czechoslovakia, in Bohemia. It stands at the S. base of the Erzgebirge, 18 m. N.W. of Leitmeritz. Sugar, earthenware, glass, and porcelain are manufactured, and there are large coalmines in the neighbourhood. Its castle has a fine collection of armour, pictures, and books. Pop. 12,100.

**Duxite.** Safety explosive. It is typical of a class in which gelignite has been modified by the addition of salts which contain a considerable quantity of water of crystallisation and produce water on disintegration, thus lowering the temperature of the explosion flame. Duxite consists of nitroglycerine 32 p.c., gelatinised with nitrocellulose, 1 p.c., sodium nitrate, 28 p.c., wood meal, 10 p.c., and ammonium oxalate, 29 p.c. The latter compound is the salt employed to reduce the flame temperature, and the explosive passes the severe Rotherham test for safety explosives for use in coal mines with a charge of 12 ozs. See Gelignite.

**D.V.** Abbrev. for *Deo volente*, God willing.

**Dvina, NORTHERN.** River of N.E. Russia, in the govt. of Vologda. It is formed by the union of the Sukhona and Yug. Flowing N.W. by Archangel, chiefly through level, marshy districts, it discharges itself into the White Sea by five mouths. It is navigable in summer throughout its entire length of 360 m., but the shoals at the mouth are a nuisance to traffic. Fish abound, especially a peculiar kind of cod (*navaga*).

**Dvina, WESTERN, or DUNA.** River of W. Russia. It rises in the lakes and marshes of the Valdai plateau in the govt. of Tver. Running S.W. and then N.W., it falls into the Gulf of Riga, 9 m. below Riga. As it forms a connexion with the Baltic and Black Seas through the Beresina canal, it is used for timber transport, partly floated and partly by boat.

**Dvina, BATTLES OF THE.** Fought between Russians and Germans, 1915-16. The first battle took place Aug.-Sept., 1915. The German armies arrayed against the Dvina, one beyond the Vindava W. of Riga, under Lauenstein, and a



second, under Below, S. of Friedrichstadt, belonged to the army group commanded in person by Hindenburg. Mitau had been taken on Aug. 1, and a day or two later forces advancing from Shavle were at Posvol, 30 m. almost due S. of Friedrichstadt, and other troops marching from Ponievicz were at Subotch, about 50 m. W. of Dvinsk. On Aug. 5 the Germans were only 10 m. from Riga, and preparations for evacuating the city were being made. A naval attack on the port was definitely repulsed by Aug. 21, and all attempts on the land side failed, but the Germans, after heavy fighting, moved forward towards Jacobstadt and Dvinsk. They were driven back in the second week of August, but were advancing again on the 24th and the following day.

#### Struggle for Friedrichstadt

About Aug. 28 Below began a great assault on the line of the Dvina, with Friedrichstadt as his chief objective. This town, on the S. side of the river, offers the only practicable crossing between Jacobstadt and Riga; on the other side of the Dvina ran the railway from Riga through Kreutzberg to Dvinsk and Vilna; from Kreutzberg passed a railway through Friedrichstadt to Mitau, and of this the Germans gained possession. On Aug. 29 the Russians repulsed a determined assault on the Friedrichstadt bridgehead, which had carried some of the enemy across the Dvina. During the night of Aug. 30 Below's troops renewed their desperate attempt to capture the bridgehead, but their repeated attacks broke down.

On Sept. 2 German cavalry stormed the bridgehead near Lennewaden, N.W. of Friedrichstadt, and next day the Russians were found to have withdrawn from the Friedrichstadt bridgehead. All through Sept. 1 and 2 Below, strongly reinforced, had pounded the Russian defences with his heavy guns, and under this pressure the Russians retired across the river. S. of Friedrichstadt the Germans advanced towards Jacobstadt, stubborn actions taking place between that town and the Lautse. On Sept. 11 a Russian offensive from Jacobstadt drove the Germans back in this district. On the same day their main attack shifted S.E. in a move across the Sventa which reached Utsiany on Sept. 12 and Svient-siany, on the Dvinsk-Vilna railway, on Sept. 13, the Russians withdrawing to Podbrodzie, the purpose of the Germans being to participate in the operations against Vilna. Meanwhile the first battle of the Dvina had died down.

The second battle was fought during Jan.-Aug., 1916. At the beginning of the year the Russian line was practically that established at the end of Sept., 1915, after the Russian retreat from Warsaw. Beginning at the coast near Riga, it ran along the left bank of the Dvina, which it crossed in one place and passed close to Dvinsk, still held by the Russians. Then, leaving the river course, it ran S. to the neighbourhood of Molodetchno, also held by the Russians, then S. to Pinsk. On this northern sector, from the Baltic to Friedrichstadt, Hindenburg was in command on the German side, and, from Feb., Kuropatkin, on the Russian. In March and April there was some intermittent fighting.

#### Hindenburg's Attack

On May 11 Hindenburg launched an ambitious but abortive offensive against the Russian positions at Selburg on the Mitau-Jacobstadt railway. He resumed his efforts on the next day, and fighting took place on the outskirts of the village of Yepukn. Another attack was launched at the beginning of June against the sector to the S. of the station of Neu Zelburg, N.W. of Jacobstadt. Henceforth Galicia became the critical area of the Eastern front, and with the repulse of a Russian attack in the Dvina sector at the end of August the second battle died down.

**Dvinsk (DAUGAVPILS).** Town and fortress in Latvia, in the govt. of Vitebsk. It stands on the right bank of the Dvina, at the junction of the Petrograd-Warsaw and Riga-Smolensk rlys. There is a considerable trade in grain, flax, and timber. Founded in 1273 by Livonian knights, the town was destroyed by the Russians in 1577, and rebuilt by Stephen Bathory, king of Poland, in 1582. In 1772 it was added to Russia, remaining part thereof until the collapse of the Russian empire in 1918. During the Great War, after much fighting for its possession, it was occupied by the Germans Feb. 18, 1917. Pop. 110,000.

**Dvinsk, BATTLES FOR.** Fought between the Russians and Germans 1915-16. During Sept., 1915, Hindenburg's attack on the line of the Dvina had given him Friedrichstadt, on the S. side of the river, but had failed to carry him across to the opposite bank. Fighting in the immediate neighbourhood of Dvinsk had resolved itself into trench warfare; behind their line the Germans, however, were massing heavy guns, and Sept. 24 saw the beginning of a determined effort to capture the town, which, as the centre of railways and roads, was strategically important. Dvinsk

was protected by fortified lines 10 m. to 12 m. S., in a region of lakes and marshes, which were formidable obstacles to an assaulting army. The chief of these lakes were Lake Sventen and Lake Medum on the S.W., and Lake Drisviaty and Lake Rytchy on the S. and S.E. Between Sventen and the Dvina ran the railway from Shavle by Ponievicz to Dvinsk, and N. of the railway passed the highway from Illukst; between Medum and Drisviaty were the highway, passing N. through Novo Alexandrovsk, and the railway from Vilna to the town.

Along these railways and roads the attack was unimpeded by natural obstacles, but while Hindenburg in his offensive of Sept. 24-25 made use of these approaches he assaulted on the whole front from the Dvina to Drisviaty. He had some success near Illukst and along the Novo-Alexandrovsk road, where his infantry pushed on to within 8 m. of Dvinsk. Elsewhere he was checked and even thrown back, as at the village of Drisviaty, which was recaptured from him on Sept. 25. As a whole the attack failed, and resulted in very heavy losses.

#### The Autumn Campaigns

Then followed a lull till about Oct. 3, when Hindenburg made his second great effort, his strength having been vastly increased in men and guns. By this time the cavalry thrust to Svientsiany and E. of Vilna had been completely held up, and thus the possibility of a drive on Dvinsk from the E., which otherwise might have materialised, had vanished. Hindenburg now mainly confined his attention to attacking in masses on the W. and S.W., while his big guns bombarded the Russian trenches in the S.E. Making a strong push near Illukst, he took the Schlossberg ridge and Illukst itself, but was held up in front of the Illukst river near the Dvina. S. of the Ponievicz railway there was a sanguinary struggle about Garbounovka and Pashalina, the former finally remaining with the Russians, on Oct. 10. Along the Novo-Alexandrovsk road the enemy progressed to the village of Medum, but was unable to advance nearer Dvinsk. This second attack was also a failure as a whole.

#### Russian Counter-Offensive

The third attack, which began on Oct. 25, made some progress from Illukst after furious encounters, and broke through at Garbounovka, but was countered and led to no further result. On Oct. 31 the Russians assumed the offensive between Lakes Sventen and the neighbouring Lake Ilsen, and in



ten days of very heavy fighting completely defeated the Germans. Towards the close of Nov. the Russians recaptured part of Illukst, and Dvinsk was perfectly safe.

The second battle for Dvinsk lasted throughout the first half of 1916. The result of the Germans' campaign against the Russians in 1915 was an important gain of territory in Poland, but their ultimate object—the destruction of the Russian armies—was as far off as ever. To capture Dvinsk became a pressing need if headway was to be made in that direction. The 1915 campaign left the line on the Russian front practically one, running due N. and S. from Dvinsk to the point where the frontiers of Rumania, Galicia, and Bessarabia meet, on the rivers Dniester and Pruth. N. of Dvinsk the line followed the river Dvina N.W. to the Baltic near Riga. N. of the Pripet marshes, the northern Russian army was commanded by Kuropatkin, the centre group of armies by Evert, and the southern by Brusiloff. The German northern armies were commanded by Hindenburg.

#### Von Below's Army Order

The Germans opened the second battle for Dvinsk on Jan. 19. They selected the district of Tennenfeld for their opening artillery attack, which was later followed by two infantry attacks easily repulsed by the Russians. On Feb. 13, the Dvinsk sector was again the scene of great activity, the enemy artillery fire being most intense near Illukst. They also attempted to surround Garbounovka, 9 m. N.W. of Dvinsk, which the Russians had just taken from them, but this attack was defeated by the Russians' cross-fire. Soon after this Von Below issued his notorious Army Order, summarising the situation and forecasting his operations.

On Feb. 28, the Russians, near Garbounovka and N. of the Ponievicz rly., succeeded in driving back the Germans and making a small advance. The Germans also assumed the offensive, and between Lakes Ilsen and Medumskoi, W. of Dvinsk, and S. of the latter, made massed attacks. A notable tactical phase of the battle was the rupture by the Russians of the German line at Jacobstadt, on the Dvina, between Riga and Dvinsk, on March 23. As a reply to this threat the Germans made aggressive attempts in the Dvinsk theatre, but without effecting any result. Two days later the Russians again attacked. Both sides were now making desperate efforts, as the course of events was largely determined by the weather con-

ditions and the approach of the spring floods. This factor determined the Russian attack of March 25, when a slight advance was made on the left bank of the Dvina at Dvinsk. April was taken up with fierce but indecisive fighting.

On June 26 Hindenburg made another costly and fruitless attack on the Dvinsk positions. Brusiloff's Galician offensive had by this time proved highly successful, and the energies of both sides were confined to merely defensive operations. The Dvinsk battle flared up at the beginning of Oct., when a heavy German attack by artillery was repulsed. A Russian gas attack on the German trenches towards the end of Nov. rounded off the second battle for Dvinsk. The fierce fighting of 1915-16 left the town in Russian possession, though there were signs that the break-up of the Russian armies was rapidly approaching. What the German armies could not accomplish, German propaganda readily effected.

**Dvorak, ANTONIN (1841-1904).** Bohemian composer. Born at Mühlhausen, Sept. 8, 1841, the son of an inn-keeper, he obtained his musical training at Prague. In 1862 he joined the orchestra of the National Theatre, and began to devote himself to composition. Through the influence of Brahms, he was invited to write a set of Slavonic dances, which made him famous. From 1892-95 he was principal of the National Conservatoire of Music at New York, but returned to Bohemia, where he died, May 1, 1904. His works include a Stabat Mater, a cantata, *The Spectre's Bride*, several brilliant symphonies and overtures, and fine examples of chamber music. He was essentially a national composer, as his strongly marked rhymes and striking harmonies attest. *Pron.* Dvorzhák. See *Studies in Modern Music*, W. H. Hadow, series ii, 1895.

**Dvůr Králové (KÖNIGINHOF).** Town and district of Czecho-Slovakia, in Bohemia. The town is an important textile centre, and is 105 m. by rly. E. of Prague. The Austrians defeated the Prussians here June 29, 1866. In the neighbourhood the Elbe valley is very fertile. Most of the inhabitants are Roman Catholics, four-fifths are Czechs, the rest Germans. Pop., town, 11,000; district, 30,000.



Dwarf. Samson, a South American dwarf, standing on the table while his manager explains a contract

**Dwarf.** Abnormally short human being. The Asiatic negrito and African negrillo races, with a maximum stature of 4 ft. 11 in., are usually called pygmies. The conventional maximum of spectacular dwarfism in the white and yellow races is 4 ft. Notable court dwarfs were Queen Mary I's John Jervis, 24 ins., and Queen Henrietta Maria's Jeffery Hudson, 18 ins. at 30, and 45 ins. at death. Examples exhibited in London during the 19th century included the Polish count Boruwlaski, 39 ins.; the American, Charles Stratton (General Tom Thumb), 31 ins., who married Lavinia Warren, 32 ins.; the Fairy Queen, 16 ins.; the Mexican Midget, Lucia Zarate, and the French princesses Topaze, each 20 ins. in height.

Dwarf races are primitive peoples whose average adult male stature is below 4 ft. 11 ins. There are two main groups: Asiatic negritos, comprising Aeta, Andamanese, Semang, Tapiro, and others; African negrillos, including Akka, Batwa, Bambute, and allied tribes.

Some writers hold that this stock, with dwarf stature as its normal characteristic in all ages, was the parent stock of all mankind. This view is unsupported by early skeletal remains, which show diminutive size in only a few scattered examples in palaeolithic Europe, besides some neolithic stations near Schaffhausen and elsewhere. Others consider these infantile peoples as dwarfed by their adverse environment. This in its turn fails to account for the constancy of the pygmy type, which has not varied since early dynastic Egypt. Even when settled husbandry introduces improved conditions, stature increases only after racial admixture.

The most satisfactory theory of pygmy origins regards these peoples as representing the early divergence from the main human stock of a tropical hunting type which has conserved its physical characters and primitive culture in racial isolation. This explains the absence of dwarf races from tropical America as well as from cold latitudes. The arctic Eskimo, the E. Siberians, and the European Lapps, together with the austral Yaghans of Tierra del Fuego, the Cape Bushmen, and the Ceylon Veddas, are short rather than dwarfish, being well above the pygmy stature, and alien to the pygmy culture. *See* Giant; Man; Negro; Pygmy.

**Dwarka.** Municipality of India. It stands on the N.W. promontory of Kathiawar peninsula, belonging to Baroda state. It contains the temple of Dwarkanath (Krishna), and is one of the holy places of India, the resort of Hindu pilgrims. Pop. 6,548, nearly all Hindus.

**Dwelling.** Habitation of mankind for repose, shelter, and domestic life. Dwellings may be natural or artificial, temporary or habitual, portable or fixed. That primeval man dwelt in tropical forest trees is a conjecture supported by anthropoid usage. Arboreal structures still characterise some primitive peoples, as among the Khas, Moïs, and in the Solomon islands. When he migrated to the limestone lands of temperate Eurasia palaeolithic man utilised the rock-shelter and the cave-dwelling. This type of habitation also survives.

The rudest effort of art upon the ground level is the wind-screen, sometimes primarily to protect the fire. Hence emerged the hut, formed by binding the tips of saplings, and often skin-covered in cold weather. Devised in the palaeolithic age, it still exists in primitive forms among the African pygmies, Bhils, Botocudos, Fuegians, and Veddas. The natural hollow, and its simulation by an artificial pit, gave rise to the beehive roof and the lean-to or pent-roof, resting on the ground. Their conical or gabled surfaces were covered with thatch, turf, earth, or skins; rudimentary forms are still known—Ainu, Chukchis, and the Eskimo snow-house (igloo).

Thus arose the two simplest of structural types, the round and the oblong. The former prevailed in neolithic and early-metallic Europe. The Swiss lake-dwellers plastered their timbered huts with clay; this wattle-and-daub construction—sometimes as a secondary derivative from the plain thatch—still

endures. The dome-shaped or conical hut, developed in local forms in aboriginal America, prevails over wide regions in negro Africa. It may have a bamboo palisade, a loose-stone wall, or a defensive stockade. When used by nomad peoples it became the round Kirghiz yurt or the American tipi.

The introduction of metal tools and carpentry replaced pit-digging by the erection of posts, walled with unhewn or hewn timber, matting, stone, or clay. Sun-dried bricks, developed early along the Nile and the Euphrates, still survive in Mexico and the Sudan. The pent became the elevated roof, whose construction displays much diverse ingenuity, from the Bantu thatch, which may be double, as in Uganda, to the interlaced palm-leaves of Polynesia and the elegant timber carving of Japan. The neolithic lake-dwellers introduced pile-foundations in shallow waters, a practice still extant in Borneo and New Guinea. This cultural advance found its full development in the hewn masonry of Egypt, whose influence, passing into the Aegean, affected the architectural achievements of the Graeco-Roman and the Indo-Aryan world, spreading thence across the Pacific to the ancient American civilizations.

The early-Aryan rectangular house led to the formation of streets, and in the eastern branch to the quadrangular enclosure, at first a cattle-pen, afterwards the courtyard characteristic of the civilized Orient. The roof-angle is determined by the problem of rain and snow, as in the steep Scandinavian gable. The flat roof characterises Semitic life in sunny lands. Many-storeyed dwellings are developed in every continent. House-partition for sex-segregation is traceable to a remote antiquity. With many primitive peoples the social organization involves separate dwellings for unmarried girls and unmarried men. Communal houses for family or tribal groups are exemplified by the long-houses of the Iroquois and the Melanesian peoples. *See* Bee Hive Structure; Cave, Cliff, and Lake Dwellings; Igloo; Kraal; Wigwam.

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**Dwight, JOHN** (fl. 1671-98). English potter. He is believed to have been born in Oxfordshire, and to have been a member of Christ Church, Oxford. In 1671 and 1684 patents were granted him by

Charles II for the manufacture of porcelain, the secret of which he claimed to have re-discovered; but he can only be credited with the invention of an improved process of stoneware. He employed Italian workmen at the Fulham pottery works which he founded; and, in addition to utilitarian stoneware, he produced many fine statuettes and busts, including those of James II and Prince Rupert.

**Dwight, TIMOTHY (1752-1817).** American Congregationalist and poet. Born at Northampton, Massachusetts,



*Timothy Dwight*

May 14, 1752, and a grandson of Jonathan Edwards, he was educated at Yale College. An army chaplain during the Civil War after being a minister at Greenfield, Connecticut, 1782-1795, he was president of Yale from 1795 until his death at New Haven, Jan. 11, 1817. His *Theology Explained and Defended*, 1818, a course of 173 sermons, has passed through more than 100 editions. He wrote the patriotic song, *Columbia*, and an epic, *The Conquest of Canaan*, and was author of an *Essay on Light*.

First of the great American college presidents, the number of students at Yale almost trebling during his presidency, Timothy Dwight was an advocate of co-education and of the higher education of women. (*See* *Three Men of Letters*, M.C. Tyler, 1895.) His grandson, Timothy (1828-1916), was professor of New Testament Greek and Exegesis, Yale divinity school, 1858-86; president of Yale, which during his term of office assumed the status of a university, 1886-99; and a member of the American committee for the revision of the English Bible, 1872-85. He contributed to the *New Englander* a series of articles on *The True Ideal of an American University*, 1870-71; and was the author of *Memories of Yale Life and Men*, 1903.

**Dwyka Series.** Shales and conglomerates beneath the Ecce formation in the S. African Karroo system. They extend for 800 m. from the Transvaal through the Orange Free State prov. and Natal into the Cape prov., with a maximum thickness of 2,300 ft. The lower Dwyka shales, of Permo-carboniferous date, were overlaid by deposits in and around the vast Karroo lake, into which icebergs broken from the faces of glaciers

dropped huge striated boulders of granite, jasper, and other rocks. The resultant conglomerate resembles English boulder-clay, but so greatly hardened as to be quarried at Umgeni for road-metal. This conglomerate was overlaid by the fine-grained upper Dywka shales, whose fossil reptiles and plants correlate them with the Indian Gondwana system. This series is named after the Dywka river.

**Dyak** or **DAYAK**. Popular name for the Indonesian non-Malay peoples in Borneo. The land Dyak embrace some settled agricultural tribes in the

Klemantan group. They use 8ft. blow-guns, sumptuous, with venom darts, and



practise cremation. The round-headed proto-Malayan sea Dyak, preferably called Iban, are the most tattooed Bornean tribe and were the most inveterate head-hunters. See Borneo.



**Dyak.** Woman in native costume. Above, man in gala dress

**Dyas** (Gr., the number two). Alternative name for the uppermost system of palaeozoic rocks, called by R. Murchison the Permian. It was introduced by J. Harcou, on the analogy of the Trias which lies above it, because it is represented in Germany by two well-marked stages, the red sandstone (Rothliegende) and the minestone (Zechstein). See Permian.

**Dyce, ALEXANDER** (1798-1869). Shakespearean editor and literary and dramatic critic. Born at Edinburgh, June 30, 1798, he was educated at the High School and Exeter College, Oxford, subsequently taking orders. In 1825 he gave up clerical work and devoted himself to editing the old dramatists. He brought out George Peele, 1828; John Webster, 1830; and Robert Greene, 1831. In 1833 he

completed Gifford's edition of Shirely, and edited Thomas Middleton in 1840, and John Skelton in 1843. He brought out the Works of Beaumont and Fletcher in 11



**Alexander Dyce,** Shakespearean editor

died in London, May 15, 1869.

**Dyce, WILLIAM** (1806-64). Scottish painter. He was born at Aberdeen, Sept. 19, 1806, and educated

at the Marischal College. In 1830 he settled at Edinburgh as a portrait-painter. In 1835 he was elected Associate of the Scottish Academy. Successful in the Westminster Hall competition, he produced a fresco, The Baptism of S. Ethelbert, the first to be completed in the existing Houses of Parliament, 1845; and in 1848 became R.A. He died at Streatham, Feb. 14, 1864. See illus. p. 753.

**Dyer, SIR EDWARD** (c. 1540-1607). English courtier and poet. Born at Sharpam Park, Somersetshire, son of Sir Thomas Dyer, he was educated at Oxford, and after Continental travel was introduced at court in 1566. A close friend of the Sidneys, and a member of the literary coterie known as the Areopagus, he enjoyed a high reputation as a man of character and a poet. He was sent by Elizabeth on a diplomatic mission to the Low Countries in 1584, acted as one of the pall bearers at Sir Philip Sidney's funeral in 1586, went on a diplomatic mission to Denmark in 1589, and acted as commissioner for the attachment of forfeited lands. Knighted and made chancellor of the order of the Garter in 1596, he retired after the accession of James I. He died in 1607, and was buried in S. Saviour's, Southwark. As a poet, he is best remembered as author of the ballad, My Mind to Me a Kingdom is, published (without author's name) in William Byrd's Medius: Psalms, Sonnets, and Songs of Sadness and Piety, 1588. See Works, ed. with memorial introduction A. B. Grosart, 1872 (Fuller Worthies' Lib.).



**William Dyce,** Scottish painter

**Dyer, JOHN** (1700-57). British poet. A Welshman by birth, after studying art for a short time he became a clergyman. His chief merit is in the appreciation for nature shown in his poems Grongar Hill and The Country Walk, both published in Savage's Miscellany, 1726. The Ruins of Rome appeared in 1740. He died Dec. 15, 1757. See Poems, ed. with biographical introd. E. Thomas, 1903.

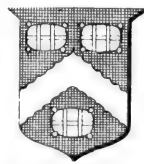
**Dyer, REGINALD EDWARD HARRY** (b. 1864). British soldier. Born Oct. 9, 1864, he was educated at Middleton College, co. Cork, and entered the R.W. Surrey Regt. in Aug., 1885. Proceeding to India, where he passed through the staff college, he joined the Indian army, reaching the rank of colonel in June, 1910. Dyer became a brigadier-general in 1916, and was created C.B. in 1917. In 1919 he commanded the 45th infantry (Jullunder) brigade, and to cope with disorders at Amritsar, he arrived there on April 11.

On April 13 he ordered his troops to fire on the mob of 5,000 assembled at the Jallianwallah Bagh, when about 379 natives were killed and 1,200 wounded. A committee appointed in Oct., 1919, to investigate the disturbances, issued its report in May, 1920, in which Gen. Dyer was severely censured. Having been superseded in India, his case was considered by the Army Council in June, 1920, by whom the report of the committee was approved, and he retired in July. There was a good deal of sympathy expressed for Dyer by those who thought his prompt action had averted a serious rising, and through The Morning Post over £21,000 was raised for him. See Amritsar, N.V.; India.



**R. E. H. Dyer,** British soldier

**Dyers' Company, THE.** London city livery company. Incorporated 1471, it was originally one of the



**Dyers' Company** arms

12 chief companies. With the Vintners it has the right of keeping swans on the Thames, and it administers a number of charities. The hall in Dowgate Hill, E.C., erected 1857, is one of four, the first of which, on the site of Dyers' Hall Wharf, was burnt in 1666.

**Dyers' Greenweed** or **Woad-Waxen** (*Genista tinctoria*). Dwarf shrub of the natural order Leguminosae. A native of Europe, it



Dyers' Greenweed, flowers and foliage

extends into N. and W. Asia. The bright yellow flowers are small, and are succeeded by smooth, flat pods, an inch long, containing about five seeds. It yields a yellow dye, which was largely used by dyers in connexion with natural indigo.

**Dyers' Oak** (*Quercus velutina*). Large tree of the natural order Amentaceae. A native of N. America, it is known as quercitron and yellow-barked oak, the rough, brown bark being orange-coloured internally. It has variously divided large leaves and small hemispherical acorns. The bark is extensively used in tanning and dyeing.



Dyers' Oak, leaf and acorn

previously applied to the fibres in the form of salts. They are, moreover, polygenetic in character, i.e. they produce different shades according to the metallic salt (chrome, aluminium, tin, or iron) previously applied to the fibre, this latter operation being technically called "mordanting." Hence the natural dyestuffs are called mordant colours, in distinction to the classes in the artificial dyestuffs, such as acid, basic salt, etc.

#### Indigo and Logwood

Natural indigo is marketed in lumps, varying in strength, and must be ground before use in the indigo vat. It belongs to the series of vat colours, and is one of the oldest dyestuffs. Logwood is used in the form of rasped wood, logwood extract, and haematein crystals. Haematein crystals contain the actual colouring principle haematein, and are the most concentrated form of dyestuff. Logwood is used in conjunction with fustic, chiefly for blacks on wool and silk, and is noted for its fine bloomy shade, which is difficult to reproduce with artificial colours. Cochineal dyed on a tin and aluminium mordant was formerly used for scarlet. Cutch is mostly employed on cotton, giving very fast browns.

**ARTIFICIAL DYESTUFFS.** These are commonly called coal tar dyes. The first artificial dyestuff was discovered by Perkin in 1856 and called mauve. Since that date some thousands of dyestuffs have been put on the market by different makers, but these do not all represent individual colours, as the same dyestuff occurs under many different names, and many also are mixtures.

#### Dyestuffs from Coal Tar

The artificial dyestuffs comprise a very large number of organic compounds, varying in composition from a simple derivative, such as picric acid, to a very complicated one, as indanthrene dark blue. Chemically, they are divided into about 15 classes, the dyestuffs in each conforming to a definite structure; but dyestuffs from different classes may behave alike from a dyeing point of view, and taking the latter as a basis for differentiation, the following classes of dyestuffs are obtained: (1) acid, (2) basic, (3) direct cotton or salt colours, (4) mordant, (5) sulphide, (6) vat, (7) insoluble colours or colours formed on the fibre.

As the name indicates, the dyestuffs of this group are derived from coal tar. From this are obtained by various processes of distillation and purification such important substances as benzene, toluene,

## DYES AND DYEING: A KEY INDUSTRY

Mark Meredith, Editor of The Indian Textile Journal

This article classifies the various kinds of dyes and describes the materials of which they are made. See the articles on materials which are dyed, e.g. Cotton. See also Perkin and other chemists

Dyes or dyestuffs are substances used for dyeing the various textile fibres, as wool, silk, cotton, artificial silk; also for dyeing leather, paper, etc., and for colouring oils, varnishes, foodstuffs.

Chemically, dyestuffs are of very diverse character, and with a few exceptions (mineral dyestuffs) are composed of carbon and hydrogen, associated with one or more of other elements, as oxygen, nitrogen, sulphur, chlorine, bromine, iodine, and sometimes with the metals sodium, potassium, or calcium.

Mineral dyestuffs comprise Prussian blue, iron buff, chrome yellow, chrome orange, manganese bronze, and metallic oxide khaki. They are chiefly used for cotton, but have lost their former importance. They are produced by depositing coloured salts of metals within the fibre, i.e. cotton cloth is impregnated with a soluble salt of a metal, squeezed, and then treated with another solution so that an insoluble metallic compound is formed and firmly fixed on the fibre. The mineral dyestuffs are very fast to light and washing, except that Prussian blue is turned brown by alkalis. Metallic oxide khaki, produced from salts of iron and chromium, was largely used during the Great War.

**NATURAL DYESTUFFS.** Dyestuffs may be divided into (1) natural and (2) artificial. The first class comprises the vegetable dyestuffs, logwood, etc., also cochineal and lac

dye, the two latter being produced from an insect. The famous Tyrian purple of history came from certain molluscs.

The most important natural dyestuffs are natural indigo, logwood, fustic, cochineal, Persian berries, orchil, cudbear, and cutch. Of lesser importance are barwood, Brazilwood, camwood, Sanderswood, and weld. In 1914 only the members of the first group were used to any great extent, and the consumption of these (especially natural indigo) was gradually declining.

During the Great War all natural dyestuffs again became more prominent, owing to the great shortage of artificial colours, and in 1920 the demand for logwood and orchil was greater than the supply. Mention should be made here of "madder," formerly much used for madder reds, but the colouring principle of this vegetable dyestuff, alizarin, is now produced artificially, and the natural product is only used in very small quantities for use in indigo vats. The chief sources of the natural dyestuffs are the W. Indian Islands, India, S. America, and S. Europe.

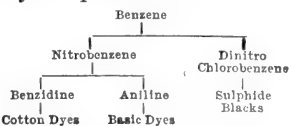
#### Natural Dyestuffs

With the exception of indigo and orchil, the natural dyestuffs are those which, applied alone to the textile fibres, possess little affinity for them, and are only of use when combined with metals,

phenol, naphthalene, and anthracene. These are all (except phenol) hydrocarbons, i.e. compounds of carbon and hydrogen. Phenol contains oxygen as well, and is commonly called carboic acid. These substances are the primary raw materials for the production of all artificial dyestuffs.

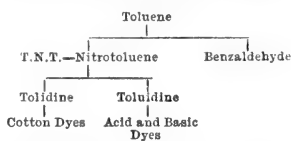
Before the actual formation of a dyestuff can take place, the substances mentioned must be converted into what are called intermediate products, and sometimes more than one intermediate takes part in the formation of a dyestuff. The formation of an intermediate or its practical manufacture is often more difficult than the actual production of the final dye product, it being frequently essential that the intermediate should be pure, otherwise the resulting shade of the actual dyestuff is impaired. Sometimes these intermediates are coloured and give coloured solutions, but do not possess the property of dyeing. It will thus be seen that for the actual manufacture of dyestuffs, the production of large quantities of pure intermediates is of primary importance. The formation of intermediates from the primary raw materials is carried out by the action of various agents, such as sulphuric acid (oleum), nitric acid, chlorine, bromine, etc., and these processes are called sulphonation, nitration, chlorination, reduction, etc.

**DYESTUFFS FROM BENZENE**  
Starting from benzene ( $C_6H_6$ ) by nitration we obtain nitrobenzene; by reduction, under various conditions, this passes into aniline and benzidine. From aniline are obtained, among others, most important basic dyestuffs; from benzidine by certain other processes, cotton colours of the direct type are produced. The first cotton colour dyeing cotton directly was obtained from benzidine. By introducing chlorine as well as nitric acid into benzene, a compound is obtained which forms the raw material for the preparation of the important sulphide blacks. Diagrammatically, the processes may be represented thus:

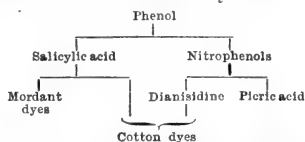


**DYESTUFFS FROM TOLUENE.**  
From toluene by nitration is obtained nitro-toluene (further nitration produces T.N.T. trinitrotoluene, the well-known explosive). Nitrotoluene on further

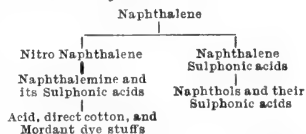
reduction gives the toluidines and tolidine, both important intermediates for direct cotton colours. From toluene also by further reactions benzaldehyde is obtained, and this is one of the intermediates for both acid and basic colours.



**DYESTUFFS FROM PHENOL.**  
Phenol on nitration gives nitrophenols which, further nitrated, give picric acid, and also by complicated reactions yield dianisidine, the intermediate also valuable for cotton dyes. Phenol, however, by other suitable treatments, furnishes salicylic acid, which is an important constituent of certain mordant colours, as diamond black and also certain cotton dyestuffs.



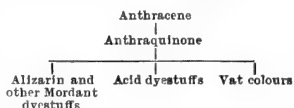
**DYESTUFFS FROM NAPHTHALENE.**  
Naphthalene is a most important primary product, and from it, by processes of nitration, reductions, sulphonation, fusion with alkalis, are obtained nitronaphthalene, naphthylamines, naphthols and sulphonic acids of these derivatives. The latter possess besides the groups at first introduced, sulphonic acid groups, which are important constituents, and not only make the resulting dyestuffs more soluble but give them an acid character. These intermediates yield acid dyes, cotton dyes and mordant dyes.



Besides the above dyestuffs, naphthalene forms a source of manufacture of synthetic indigo. By a series of chemical changes, naphthalene is converted into the intermediate phthalic acid, from which are obtained dyestuffs of most brilliant shades such as rhodamine.

**DYESTUFFS FROM ANTHRACENE.**  
Anthracene furnishes the starting point for a large number of most important wool and cotton colours, these being especially important on account of their very good fastness to light, wear, etc. The

most striking is alizarin, produced artificially at the same time by Perkin and the German chemists Gräbe and Liebermann. Anthracene by oxidation gives anthraquinone which on sulphonation and then a subsequent fusion of the product with caustic alkalis yields the most important dyestuff, alizarin. Besides alizarin, other mordant colours are obtained from anthraquinone, also very important acid colours such as alizarin saphirol. Again, from anthraquinone the latest series of vat colours are evolved. These vat colours are solely used for cotton dyeing, the vat colours dyeing wool being derived from indigo.



**ACID DYESTUFFS.** These are largely used for wool and silk dyeing. Among them are colours which are fugitive to light, also others which are extremely fast to light. Their fastness to other agents, washing, etc., also varies considerably. They are employed for woollen and worsted piece goods, especially for ladies' wear.

**BASIC DYESTUFFS.** To this class of colours belong the most brilliant of artificial dyestuffs, which, however, as a class are very fugitive to light. They also possess the objectionable property of rubbing off on to adjacent white material. They find their chief employment in calico printing, also for cotton dyeing for which the cotton has to be previously mordanted with tannic acid and tartar emetic. They can also be dyed on wool.

Salt dyestuffs are so named because they are used for dyeing cotton from a bath containing common salt. Used in enormous quantities (especially blacks) for this purpose, this group contains colours of every shade, which possess properties of very varying degrees of fastness. Some are very important for union dyeing, as they dye wool equally well from a salt bath.

Mordant dyestuffs form a class of extreme importance, especially for wool dyeing. Used where great fastness is required, especially to the operation of milling, they probably find their greatest application in loose wool dyeing, but are also employed on pieces, especially for men's wear. On cotton, alizarin is used for the Turkey red process.

**SULPHIDE DYESTUFFS.** These colours are only of importance for cotton dyeing, although they can



be applied to wool. They are used in large quantities, especially sulphide blacks. At present a good range of sulphide dyestuffs is not available, a bright red being absent. These colours are not soluble in water, and have to be dissolved with the aid of sodium sulphide. On cotton they produce shades of extreme fastness to washing, vary in fastness to light, but are poor to bleaching.

**VAT DYESTUFFS.** This is now an important class of colours, although indigo was the only one known up to comparatively recent times. They are all insoluble in water, and are made soluble by a process of reduction, whereby they become soluble in an alkaline bath. Only indigo and its derivatives are used for wool dyeing on account of the strongly alkaline bath required for the other classes (Indanthrenes, Algoles, etc.). All are used for cotton dyeing, and the class contains some of the fastest colours existing. They are used for curtains, etc., where great fastness to light is required.

**INSOLUBLE COLOURS.** To this group belong aniline black, Para red, etc. Aniline black is formed on the cotton fibre by the oxidation of aniline, previously applied to the fibre in the form of a soluble salt. It is a very fast black, and recognized as a standard for cotton goods, but it has been replaced to a considerable extent by sulphide blacks, which are easier of application. Para red is obtained by actually forming an insoluble colour on the fibre by the successive combination of its components.

Before 1914, 90 p.c. of the total quantity of artificial dyestuffs was produced in Germany. After 1918, however, large factories were erected in Great Britain, America, and France.

**Bibliography.** Dictionary of Dyes, Mordants and other Compounds, C. Rawson and others, 1901; A Treatise on Colour Manufacture, G. Zerr and R. Rübenkamp, Eng. trans. C. Mayer, 1908; A Manual of Dyeing, E. Knecht and others, 2nd ed. 1910.

**Dyke or DIKE.** Defensive earth-work or its adjacent ditch, especially in early Britain. Dykes may be promontory forts, or protective works as used in Holland, and in Great Britain as fenland causeways. Some were made or re-used for national or tribal boundaries. Red Earl's Ditch, along the Malvern Hills, was feudal. The greatest, Wansdyke, 80 m. long, from the Severn to Inkpen Beacon, Berks, was pre-Roman. Black Dyke, from Richmond, Yorks, across the Roman Wall to Peel Fell, Northumberland, continues as the Catrail for 48 m. to Galashiels, Selkirk-

shire. Roman Dyke, Rushmore, Wilts, was Romano-British. There are 25 in Dorset, and, perhaps, 50 elsewhere, some being of Commonwealth date. (See Devil's Dyke; Grim's Dyke.)

In geology, dykes are wall-like masses of rock formed in vertical or highly inclined fissures in older formations. The name arose from their resemblance, when the softer enveloping rocks have been weathered away, to the structures made by man; in W. Scotland they are actually utilised as enclosures.

The most typical dykes comprise basalts and similar rocks intruded by igneous action. They often form ribs spreading radially from volcanic craters. When the molten lava has receded from the inner part before cooling, hollow dykes result. A vast system, covering 40,000 sq. m. from Orkney to Yorkshire, comprises dykes varying from a few inches to 70 ft. in breadth, and up to 100 m. long, notable examples being the Cleveland and Acklington dykes. The long line of fissure-eruptions occurring in Iceland in 1783 formed a new subterranean dyke 20 m. long.

Sedimentary dykes have been formed in all geological ages, such as the pre-Cambrian sandstone dykes at Ben Sioch, Ross-shire, and those of limestone near San Francisco. These are sometimes due to the filling-up of fissures caused by submarine earthquakes.

**Dykes, JAMES OSWALD** (1835-1912). British theologian. Born at Port Glasgow, Aug. 14, 1835, and educated at Dumfries Academy, Edinburgh University, and New College, Heidelberg, and Erlangen, he was ordained at East Kilbride, 1859.

Colleague of Dr. James Oswald Dykes, Candlish (*q.v.*), at Free S. George's, Edinburgh, 1861-64, he resigned through ill-health. After spending three years in Melbourne, Australia, he was minister of Regent Square Presbyterian Church, London, 1869-88; and principal, 1888-1907, of the English Presbyterian College, Queen Square, London, afterwards removed to Cambridge, and known as Westminster College. His works include *The Beatitudes of the Kingdom*, 1872; *The Gospel According to S. Paul*; studies in the first 8 chapters of his Epistle to the Romans, 1888; and *The Divine Worker in Creation and Providence*, 1909. He died Jan. 1, 1912.

**Dykes, JOHN BACCHUS** (1823-76). British musician and church-

man. Born at Hull, Mar. 10, 1823, he studied music at Cambridge and became a clergyman. In 1849 he was appointed precentor of Durham Cathedral and vicar of S. Oswald's, Durham. He was one of the editors of *Hymns Ancient and Modern*, and composed a large amount of church music, including many hymn tunes; some of these—*Nearer my God to Thee*, and *Jesu, Lover of my Soul*—have attained immense popularity. He died Jan. 22, 1876. See *Life and Letters*, ed. J. T. Fowler, 1897.

**Dykh-Tau.** One of the heights of the Caucasus (17,000 ft.) in the highest part of the range.

**Dymoke.** English family in which the ancient office of king's champion is hereditary. The origin of the Dymokes is variously traced to the village of Dymoke, in Gloucestershire, and to a place of that name on the Welsh border. Sir John Dymoke (d. 1381) was champion at the coronation of Richard II, the earliest recorded performance of the ceremony, and based his right on his ownership by grand serjeanty of the manor of Scrivelshy, in Lincolnshire. Henry Dymoke (d. 1865) was champion at George IV's coronation, after which the ceremony was discontinued, though the office remained. In the reign of George V the champion was Frank Seaman Dymoke. See *Champion*.

**Dynamical Equivalent of Heat.** Whenever work is converted into heat, or vice versa, there is an unchanging relation between the work done and the heat produced or lost. The quantity of work exerted to produce the unit quantity of heat energy is called the dynamical equivalent of heat. The first to determine this equivalent was Joule, whose first method consisted in measuring the heat developed when a known amount of work was done in stirring water. It has been found that the energy converted into sufficient heat to raise the temperature of one gramme of water one degree (from 14.5° to 15.5°) is 4.182 centigrade times 10,000,000 ergs, where the erg is the unit of work. See *Heat*; *Thermodynamics*.

**Dynamics** (Gr. *dynamis*, power). Branch of the science of mechanics which investigates the action of force. It therefore includes the investigation of the conditions of bodies which are in a state of equilibrium owing to the forces acting upon them, although this special branch of the science is often referred to as "statics." The investigations depend ultimately on the Newtonian Laws of Motion. The various depart-



James Oswald Dykes,  
British theologian  
Moffat



ments embrace the dynamics and statics of a particle which is acted upon by forces in one plane or in more than one plane; the plane dynamics of a rigid body; the three dimensional statics or dynamics of a rigid body, with which is associated the theory of screws; and by an extension within modern limits of the meaning of the term dynamics, those problems of analytical dynamics which investigate the action of forces on systems of particles, or the "problem of three bodies," which refers to the mutual attractions of three bodies in space, e.g. the Earth, Sun, and Jupiter, a problem which can only be solved in special cases. See Motion.

**Dynamite.** Name applied to a variety of high explosives of which the essential feature is a high content of nitroglycerine, absorbed in an active or inert porous base. Dynamite was invented by Nobel in 1866, when, owing to many disastrous explosions nitroglycerine was prohibited in various countries. He found that it could be rendered comparatively safe by absorption in kieselguhr (*q.v.*), which is capable of retaining up to three times its weight of nitroglycerine. This mixture is still known as No. 1 dynamite, whilst No. 2 and No. 3, which are more rarely used, contain 35 p.c. and 25 p.c. of nitroglycerine respectively. About 1 p.c. of magnesium carbonate or chalk is usually added to neutralise the acid evolved by nitroglycerine on storage.

The calcined kieselguhr is weighed out into a rubber bag, after it has been thoroughly mixed with the carbonate and sieved, the nitroglycerine being added in small portions, while the mass is kneaded by hand to form a paste, the operation lasting about 30 minutes. The dynamite is formed into cartridges by pressing it into parchment paper tubes by a wooden plunger working through a funnel. All these operations are dangerous and only small quantities of explosive are dealt with in light buildings protected by mounds.

In America kieselguhr has been largely displaced as the absorbent by "active" bases, generally consisting of a mixture of wood meal, flour, or similar carbohydrate and sodium or potassium nitrate. A whole series of dynamites is made with nitroglycerine contents rising by 5 p.c. from 15 p.c. to 69 p.c., but this range of dynamites has never been popular in Europe, although a variety of explosives of the same type are employed for various purposes.

Dynamite is a powerful high explosive of considerable brisance, while its plasticity is a great advantage in filling boreholes and applying it to solid objects for demolition purposes. It is safe to handle and transport, but is too sensitive to shock for employment in shell, and since it is detonated by the impact of a rifle bullet it is not a safe military store. If ignited in small quantities it burns fiercely but does not explode. Black powder will cause it to explode, but complete detonation can only be effected by initiation with a detonator.

Dynamite has two marked disadvantages, one being that exposure to moisture displaces the nitroglycerine, causing exudation and dangerous sensitivity, and secondly, it freezes about 10° C. when, whilst it is more insensitive to detonation, causing misfires, it is more sensitive to shock and friction. Frozen dynamite must be carefully

thawed in a special oven. Exudation is guarded against by the use of special wrappers, and freezing may be prevented by using nitroglycerine containing substances which lower its freezing point and storing the dynamite in heated magazines. Dynamite is chiefly used for blasting operations where a powerful shattering effect is required. See Explosives; Nitroglycerine; Safety explosives.

**Dynammon.** Safety explosive manufactured by the Austrian government. Two varieties are made, Wetter-dynammon, composed of ammonium nitrate 94 p.c., charcoal 4 p.c., potassium nitrate 2 p.c.; and dynammon, composed of ammonium nitrate 87.5 p.c., charcoal 12.5 p.c. The former is the more suitable for use in coal mines where coal dust or explosive gas may be present. They are prepared by milling the dried ingredients together in mills such as are used for gunpowder.

## DYNAMO: A GENERATOR OF ELECTRIC POWER

J. L. Prithard, Editor of The Aeronautical Journal

*In this article is given in brief outline the principle of the dynamo from Faraday's initial discovery. Further information on the subject will be found under the articles Alternating Current; Alternator; Armature; Commutator; Electricity; Magnetism*

Oersted in 1819 discovered that a wire conveying an electric current is surrounded by a magnetic field, a magnetic needle tending to set itself at right angles to the wire carrying the current. Following this Michael Faraday experimented to find out if the converse were true, i.e. if a magnetic field could induce an electric current, and eventually in 1831 he succeeded in making this all-important discovery the forerunner of the modern dynamo.

Faraday discovered that if a magnet were passed through a coil of wire a current of electricity was induced in the wire while the magnet was moving. The same effect was produced if the magnet were kept still and the wire moved. If the magnet be horseshoe in shape the magnetic field is concentrated, and if a ring of copper wire be passed between the poles, cutting the lines of force of the magnetic field at an angle, an electric current passes along the wire.

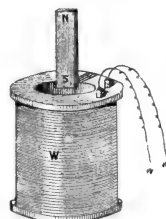
This is the essential principle of the dynamo or electric generator, and from this simple fact has been built up the complicated modern dynamo. Fig. 1 shows Faraday's famous experiment.

Since the strength of the magnetic field is not constant at all points of the magnet, it follows that as the coil of wire moves across it the strength of the in-

duced electric current varies. Moreover it is found that decreasing the number of lines of force passing through the conductor produces an induced current in one direction, while increasing the

number of lines through the conductor produces an induced current in a contrary direction. In other words, currents alternate along the wire as it passes across the magnetic field.

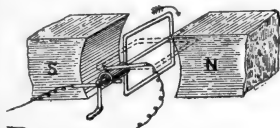
The strength of the induced current, E.M.F. or e.m.f.,



**Dynamo. Fig. 1.** Faraday's experiment. N S is a magnet which is moved into the hollow coil of wire, W, causing a current along the wires w, w.

tromotive force, is proportional to the strength of the field, or rather to the number of lines of force cut by the ring in a given time, and the direction of the current is at right angles to the lines of force and to the direction in which the ring is moved. If the plane of the moving ring is parallel to the lines of force, equal and opposite currents would be induced and would neutralise one another. By a device known as the commutator the alternating

current induced in the coil can be changed into a direct or continuous current traveling always in one direction. Fig. 2 shows the essential principle of a commutator. The ends of the coil are joined to two halves of a split tube, which is fastened to a spindle on which the



Dynamo. Fig. 2. Diagram showing essential principle of a commutator. N and S are the opposite poles of a magnet between which the wire coil is made to revolve

coil revolves, in such a way that the two halves are insulated from one another. Two metallic plates, or brushes, are arranged so that the induced currents pass through them to the external circuit from the segments of the coil. The segments change brushes as the coil takes up the position where the induced current is zero.

The intensity of the current is increased if a flat coil of many turns of wire be substituted for the simple coil, but even then a cycle occurs only once per revolution. To increase the number of cycles and so make the current more constant, a large number of coils are used, arranged at angles to one another in external grooves cut upon the surface of a drum of soft iron plates, which has the effect of concentrating the lines of magnetic forces into the path of the coils. An intense magnetic field is obtained by using electric magnets, excited by a current through the coils encircling them, in place of the permanent magnets employed in the early machines. These two chief parts of a dynamo are the Armature and Field Magnet System or Field.

In direct current machines the armature is the revolving part, but in alternating current machines it is usually found expedient to employ stationary armatures and revolving field-magnets.

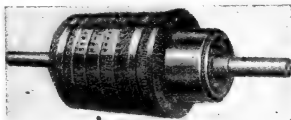
**DIRECT CURRENT DYNAMOS.** The armature of a direct current dynamo consists of a number of very thin circular sheets or laminations of charcoal iron pressed together on a shaft or spindle so as to form a cylinder or drum. Each disk is insulated from its neighbour, in order to reduce the so-called Foucault currents which would cause a solid mass of iron to heat excessively. The soft iron core of an armature, whether revolving or fixed, concentrates the magnetic field. The surface of the drum has

longitudinal slots (Fig. 3) in which the conductors or windings are embedded. The three openings surrounding the central hole communicate with air ducts for the purpose of ventilating and cooling the armature. Very large armatures have a hollow or ring core. The ring is carried on radial spokes from a hub keyed on to the shaft, the arrangement being termed a spider. At one end of the armature is the commutator, composed of a number of segmental copper bars insulated from each other, and from the shaft. A complete drum armature is shown in Fig. 4, the commutator being the smaller of the two cylinders.



Dynamo. Fig. 3. Diagram showing longitudinal slots in which the conductors of an armature are embedded

E.M.F. in the coil is reversed, causes the current to flow in one direction. If, instead of being connected to the commutator bars the beginning and the end of the complete spiral were joined to a separate collecting ring, the current would not be rectified, but delivered as alternating current.



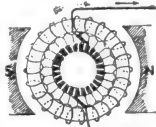
Dynamo. Fig. 4. Complete drum armature

Nearly all modern drum armatures are wound upon what are known as the lap and the wave principles, the first being adapted to large currents of low voltage and the second to small currents of high voltage.

In lap winding each winding forms a loop, lapping over other loops, and each end is joined to a commutator segment. Wave

winding follows a zigzag line round the core, the successive coils being connected in series.

The term brush used here is derived from the bundle of copper wires, thin sheets or gauze formerly employed; but carbon is now used except for the collection of currents of very low tension. Contact with the commutator is maintained by the pressure of a light spring



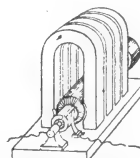
Dynamo. Fig. 5. Ring winding on an armature, shown diagrammatically. N and S, north and south poles of the magnet

The field magnet system of a dynamo, originally in the form of a hardened steel permanent horseshoe magnet, or assemblage of magnets, as in Fig. 6, usually consists of two, four or more cores, contained within a circular yoke. For many years the horseshoe form was retained, but in this the loss of strayed magnetism is greater. It was early discovered that the residual magnetism present in soft iron was sufficient to provide for the generation of an initial current by which the magnetism could be "built up;" the final result being a field far more powerful than could be obtained from permanent magnets. Soft wrought iron and special kinds of soft steel have a higher "permeability" or magnetic conductivity than cast-iron, and the magnet cores are therefore of this material, except in the case of very small machines. In quite small machines the low residual magnetism of wrought iron leads to excitation difficulties, besides which the cast-iron construction is cheaper.

Magneto machines are still used for special purposes where instant generation of small currents is required.

The direction of the winding of the magnet coils is such that the cores become N. and S. poles alternately, and the winding may be in "series," "shunt," or a combination of both ("compound") with the external circuit.

In series winding (see Fig. 7) the whole of the current passes through the magnet coils,



Dynamo. Fig. 6. Field magnet system, original form of magneto

which in this case consist of a small number of turns of thick wire. In other words, the armature, field coils, and the external circuit are in series. A series

machine generates, within limits, a current of constant quantity: increase of output being represented by a rise in voltage. Series machines were formerly much used for series arc lighting. With "shunt" (Fig. 8) winding only a fraction of the current delivered to the circuit passes through the field

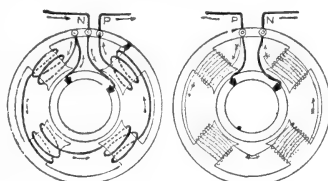
coils in static transformers (which can only be employed with alternating currents) and a recognition of the value of high voltage for long-distance transmission of electrical energy, directed attention to the "alternator."

Direct current dynamos are not adapted to the production of high

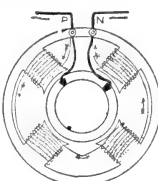
voltage currents, owing, mainly, to the practical difficulty in collecting such currents from the commutators, and partly to the difficulty in insulating the coils on the revolving armature.

With alternators these difficulties can be overcome and machines have been constructed to supply current at 15,000 volts. A lower pressure—from 12,000 to 13,000 volts—is, however, generally regarded as the advisable limit.

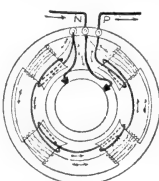
If a higher voltage is required, the usual practice is to raise it by means of a transformer. The high voltage generally associated with the alternators has led to a fundamental change in their design, viz. the moving of the magnetic field in



Dynamo. Fig. 7. Series winding



Dynamo. Fig. 8. Shunt winding



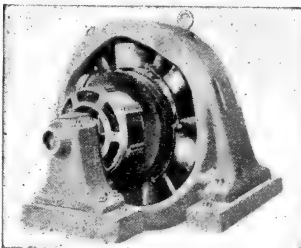
Dynamo. Fig. 9. Compound winding

coils, which contain many turns of fine wire.

In the compound-wound dynamo (Fig. 9) the series winding compensates for the loss of voltage in the armature due to increased output, and a compound machine may be made self-regulating for varying loads. By "over-compounding," that is, increasing the proportion of the series winding, it is possible to provide for an increase of voltage with increase of load. In this way a loss of pressure in distributing mains, owing to the extra work put upon them, may be made good. Compound dynamos or generators are employed for direct electric lighting and for power and traction services.

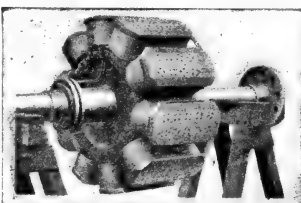
Figure 10 represents a modern direct-current dynamo. Small pole-pieces between the main pole-pieces will be noticed; these are known as "interpoles," or "commutating" poles. They are excited by a few turns of series winding, and their function is to reduce the effect of armature reaction, and so prevent sparking between the brushes and the commutator when a change of load takes place. A change of load causes a change of flux, and this formerly necessitated an adjustment of the position or "lead" of the brushes which required constant watchfulness.

**ALTERNATING CURRENT DYNAMOS.** In the early days of electrical engineering, motors, arc lamps and other appliances had not been developed for alternating-current, therefore all dynamos were provided with commutators, which changed the alternating into direct currents. One special kind of machine—the "uni-polar" or "homopolar"—actually generates a direct current, but although it has occupied the attention of inventors for many years past, it is still in the experimental stage. Improve-

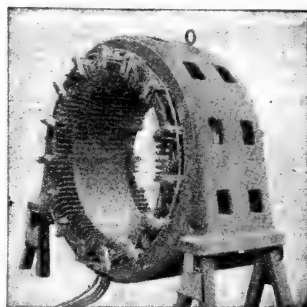


Dynamo. Fig. 10. Modern direct-current dynamo

ment in static transformers (which can only be employed with alternating currents) and a recognition of the value of high voltage for long-distance transmission of electrical energy, directed attention to the "alternator."



Dynamo. Fig. 11. Field magnet of alternator

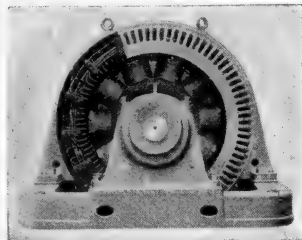


Dynamo. Fig. 12. Armature of alternator

In this way the current from the armature can be led off without the interposition of any moving collector, while the insulation is not cramped or subjected to mechanical stress. The current necessary to excite the field magnets is of low voltage, and is led to them by carbon brushes bearing upon two "slip" rings revolving with the field-magnet system. In another kind of machine (the "Inductor" Alternator) both field magnets and armature are stationary, but have an annular space between them. The annular space is traversed by bare poles ("inductors"), attached to a revolving spider. The poles complete the magnetic circuit between the field-magnets and the armature coils as they pass between them, and, in doing so, cause the necessary variation in magnetic flux. To avoid confusion, the revolving portion of an alternator is called the "rotor" and the stationary part the "stator"—names which do not necessarily distinguish between armature and field-magnets. It has been pointed out that to increase the number of alternations per revolution, a large number of coils are employed. One complete impulse outwards and then back is produced by the revolution of two pole-pieces past a conductor (or vice versa), so that the number of alternations per second ("periodicity" or "frequency") is governed by the speed of revolution and the number of pairs of poles.

Formerly machines giving as many as 100 or more cycles per second were employed; to-day the frequency varies from 25 to 60 cycles, but, except for special purposes, the present tendency is in favour of 50 cycles. If the exciting current be direct (non-alternating), the generator is said to be of the "synchronous" type, since at a given speed the frequency will always be the same, depending, as before mentioned, upon the number of poles and angular

velocity. This does not hold good of the "induction" alternator in which the frequency depends upon the characteristics of an external (polyphase) alternating current producing the field. So far, alternators have only been considered in respect of what is known as a "single-phase" circuit. If a second set of armature coils be interposed in the spaces between the original set (doubling the armature, in fact) two distinct alternating currents will be generated, the



Dynamo. FIG. 13. 1,000 k.w. Westinghouse 3-phase alternator, showing field magnets inside armature

one following the other at a quarter of a period. For this reason this is sometimes called the "quarter-phase" system. If the principle be extended to three similar, but separate sets of coils, three equal alternating currents, one-third of a phase apart, will be obtained (see Fig. 14). The use of "polyphase" currents secures a greater output for given weight of generator and also requires less copper in transmission lines and is far more suitable for motor circuits. See Distributor.

**Dynamo-Metamorphism** (Gr. *meta*, implying change; *morphē*, form). Alteration of rock-structure by the lateral pressures induced by movements in the earth's crust. The term was introduced by A. Harker to denote the effects of high pressure and low temperature, thermo-metamorphism being used to denote the effects of low pressure and high temperature. The alternative terms, regional and contact metamorphism, are roughly synonymous with dynamic and thermal metamorphism respectively.

The changes produced are physical and mineralogical, and usually render rocks more highly crystalline. Homogeneous rocks under pressure develop cleavage-planes, foliation and schistose structure. Thus clays, shales, or fine-grained volcanic dust may become roofing-slates, coarse-grained rocks may become gneisses. Heterogeneous rocks, if brittle and yielding strata are intermingled, develop folding and faulting. Mineralogical



Dynamo. FIG. 14. Armature of 3-phase alternator, 6,600 volts

changes include re-crystallisation into a mosaic of smaller crystals and the formation of mica. See Crystallography.

**Dynamometer** (Gr. *dynamis*, power; *metron*, a measure). Device for measuring force or power.

Though the term dynamometer has been extensively used for many different kinds of measuring instruments, it is more commonly applied to instruments used for measuring the h.p. of engines. They may be divided into three classes: (1) those for measuring the pull of anything; (2) those for measuring the push or thrust; and (3) those for measuring twisting power or torsion.

The first type measures such forces as those exerted by railway locomotives, traction engines, etc., and consist essentially of a powerful spring balance through which the power is applied. The second type measures such forces as the thrust of an aeroplane propeller or steamship screw, and the third the force exerted by a revolving shaft, and both the latter may consist of recording springs or brake attachments.

When a brake is used it absorbs power and the dynamometer is called an absorption dynamometer. Transmission dynamometers measure the horse-power of machines without any absorption of power, save that due to friction, and the majority consist of recording spring devices.

The illustration shows a common type of brake dynamometer. To one end of a rope, encircling the fly-wheel of the engine, is attached a weight, and the other end is fastened to a spring. The motion of the wheel tends to lift the weight, and this tendency is measured on the spring and from it, and the known revolutions per minute of the fly-wheel, the horse-power being exerted may readily be calculated.

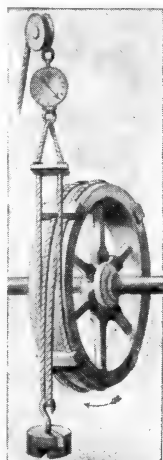
**Dynamotor.** Combined form of motor and dynamo. It consists of one field magnet and two armatures, or one armature with two windings, one receiving current as a motor and the other generating current as a dynamo.

**Dyne** (Gr. *dynamis*, power). Unit of force which, applied to a mass of one gramme, produces an acceleration of one centimetre per second every second. This force is very nearly equal to the force with which the earth attracts a weight of one milligramme. The erg, the unit of work, is done when a body acted on by a force of one dyne moves through a centimetre in the direction of the force. Approximately an erg of work is done when a milligramme is raised through one centimetre. 10,000,000 ergs equal one joule.

**Dynobel.** British safety explosive of the perchlorate type. It consists of nitroglycerine, 32.5 p.c., partially gelatinised with nitrocellulose, 0.7 p.c., potassium perchlorate, 27 p.c., wood meal, 10.3 p.c., and ammonium oxalate, 29.5 p.c. The dry salts and part of the wood meal are placed together in a pan and mixed by hand; the partially gelatinised nitroglycerine is then added, the container being wiped out with the rest of the wood meal, and the whole roughly mixed by hand and then incorporated in a machine of the type employed for blasting gelatine or cordite at a temperature of about 30° C. for an hour.

**Dysart** (Lat. *desertum*, solitude). Royal and mun. burgh and seaport of Fifeshire, Scotland. It stands on the Firth of Forth, 28 m. N.E. of Edinburgh by the N.B. Rly. It derives its name from a cave near Dysart House reputed to have been the cell of S. Serf. It has a good harbour, and engages in linen manufacture, shipbuilding, and the export of coal. Pop. of mun. bor. 4,197.

**Dysart**, EARL OF. Scottish title borne since 1643 by the families of Murray and Tollemache. Sir Lionel Tollemache, a member of a family long settled in Cheshire, was made a baronet in 1611. His grandson, Lionel, married Elizabeth, daughter of William Murray, who, in



Dynamometer. Common type of brake dynamometer

1643, had been made Lord Huntingtower and earl of Dysart. Murray had no sons, and his daughter succeeded to the earldom, obtaining from Charles II, in 1670, the right to name her own heir. She became later the wife of the duke of Lauderdale, but had no children by her second marriage.

Her son Lionel became the 3rd earl, and the title continued with his descendants until the 6th earl died in 1821, when it passed again to a female, his sister Louisa Manners. She became countess of Dysart, and her grandson became the 8th earl in 1840. In 1878, William John Manners Tollemache became the 9th earl. The earl's seats are Buckminster Park, Grantham, and Ham House, Petersham, and his eldest son is known as Viscount Huntingtower.

**Dysentery** (Gr. *dys*, implying badness; *entera*, intestines). Medical term applied somewhat loosely to several distinct affections. These resemble each other in having irritation of the bowel as a prominent symptom, often associated with diarrhoea and blood in the motions.

Amoebic dysentery is caused by a minute organism (amoeba) which enters the body with food or drinking water. The disease is widespread throughout the tropics, and is also met with in the U.S.A., Germany, Russia, and Italy. In the acute form the onset is abrupt, with pain, diarrhoea, and passage of blood. The patient rapidly loses flesh, and death may occur in a week or ten days from exhaustion and enfeeblement of the heart. The chronic form may follow an acute attack, or may develop insidiously. The condition may persist for years, with alternating periods of constipation and diarrhoea. Ultimately emaciation may be very marked. Abscess of the liver is a frequent and serious complication; gangrene of the bowel and peritonitis sometimes occur. The treatment consists in keeping the patient in bed, with skilled nursing and very careful dieting. Ipecacuanha, or its active principle emetine, has proved of great value. Intestinal irrigation may be useful, and in some cases surgical methods afford the only hope of saving life.

Bacillary dysentery is caused by infection with a bacillus of which there appear to be several forms. This variety of dysentery occurs all over the world, though it is more frequent in hot than in temperate climates. The disease is very infectious, the bacilli being conveyed into the system by food and drinking water. Flies take an

active part in its spread. In the acute form the symptoms are pain, rapid rise of temperature, and diarrhoea with passage of blood. Death may occur within a few days. In cases which improve, the patient is convalescent in two or three weeks. After an acute attack, chronic dysentery may persist for years, with intermissions of varying length.

**Dysidrosis** (Gr. *dys*; *hidrōs*, sweat), **POMPHOLYX** (Gr., bubble, vesicle) or **CHEIRO-POMPHOLYX**. Acute eruption of vesicles on the skin of the hands and feet with excessive sweating. It sometimes follows local irritation, as in medical men after the use of antiseptic solutions. Burning and extreme itching are the most marked symptoms. The condition is worse in spring and summer and often tends to recur at the same period of the year. Scratching may lead to secondary infection and severe eruptions. Treatment consists in building up the general health, while local applications of zinc ointment, salicylic acid, and other drugs are useful. Exposure to X rays has proved beneficial in intractable cases.

**Dyson, SIR FRANK WATSON** (b. 1868). British astronomer. The son of a Baptist minister, he was born at Ashby, Jan. 8, 1868, and went from Bradford Grammar School to Trinity College, Cambridge, of which society he became a fellow. In 1894 he entered the Royal Observatory, Greenwich, as chief assistant.

Five years later he became secretary of the Royal Astronomical Society, and in 1901 F.R.S. In 1905 Dyson was made astronomer-royal for Scotland, and in 1910 was transferred to the corresponding position in England. In 1915 he was knighted.

**Dyson, WILL** (b. 1883). British cartoonist. Born at Ballarat, Australia, and educated at Melbourne,

he first attracted attention with his cartoons for The Daily Herald. As a pictorial satirist of unusual imagination and dramatic power, he championed not only the rights of La-

bour, but also the larger cause of political freedom. His cartoons of the Great War were specially incisive.

**Dyspepsia** or **INDIGESTION** (Gr. *dys*; *pepsin*, *peptin*, to cook, digest). Acute dyspepsia or acute gastric catarrh is most frequently due to errors in diet. It may be caused by eating too large an amount of food or unsuitable food, such as unripe fruit, or food which has begun to decompose. Alcoholic excess is another cause, and acute dyspepsia is sometimes an early symptom of many of the infectious fevers. The symptoms are pain in the stomach, nausea, vomiting, bringing up of wind, headache, and depression. Sometimes, particularly with children, there may be a rise of temperature. Diarrhoea or constipation may follow. The tongue is furred. Treatment consists in withholding food for the first 24 hours, and subsequently giving a light and easily digested diet. In children, a dose of castor oil is often helpful, and for adults a dose of calomel, followed next morning by a saline purge.

Chronic dyspepsia results from chronic gastritis, which may follow the long-continued habit of taking unsuitable food, or excess of alcohol, or may be a symptom of many diseases, such as gout, diabetes, Bright's disease, tuberculosis, anaemia, and cancer of the stomach. The symptoms are a sense of fullness or distress after eating, with pain apparently in the region of the heart, known as heartburn, nausea, sometimes vomiting, flatulence, headache, depression, and usually constipation, though sometimes diarrhoea. In simple chronic dyspepsia the treatment consists in taking a light and easily digested diet. Meals should be eaten slowly and well masticated. Pepsin, pancreatin, and other digestive ferments may be administered. Bitter tonics, such as quassia and gentian, are often useful.

Where the dyspepsia is a symptom of a general disease, that condition also must receive the appropriate treatment. Some persons suffer from chronic dyspepsia for which there is no apparent cause, and in whom all the organs appear to be healthy. See Diet; Food.

**Dytiscus** (Gr. *dytēs*, diver). Generic name for the larger carnivorous water beetles common in ponds throughout Great Britain. They swim with considerable speed, but have to come to the surface to obtain a fresh supply of air, which is stored under the wing-cases for breathing when under water. These beetles prey on tadpoles and the fry of fish. See Beetle.



Sir Frank Dyson.  
British astronomer.  
Russell



Will Dyson.  
British artist  
Elliott & Fry





**E.** Fifth and most frequently used letter, and the second vowel of the English and Latin alphabets. Its chief sounds are those heard in *me*, the Italian *i*, and in *men*, really the short sound corresponding to *a* in *mane*. In words like *there*, *here*, *her*, the pronunciation is influenced by *r*. In *clerk*, *serjeant*, *e* has the sound of *a*. As a rule, *e* final is itself mute, but its usual effect is to lengthen the preceding vowel; e.g. *mal*, *mate*, but *give*, *live*. When *c* and *g* precede, their pronunciation is generally modified, e.g. *fence*, *certain*, *gender*.

The combinations of *e* with other vowels represent various sounds: *ea* usually *ee*, as in *meat*, but at times as in *bread*, *head*, *great*, *pear*, *heart*; *eau* in French words is a long *o*, as in *portmanteau*, but in *beauty* as *iu* (*yü*). *Ei* is a long *a* or *ee*, as in *weight*, *deceit*, but has a short *i*-sound in *foreign*, *sovereign*, sometimes long as in *height*, neither (also *neither*). *Eo* is a long *ee*, as in *people*, but *yeoman* is an exception; in words like *gudgeon*, *surgeon*, the sound is almost that of short *u* or *o*. *Eu*, *ew* have the sound of *iu* (*yu*), as in *deuce*, *new*, but of *o* in *sew*. In *ey* when accented, the sound is that of a long *a*, as in *purvey*, but when unaccented, as in *valley*, the sound approaches that of short *i*. *Key*, like its homonym *quay*, is pronounced *kee*. See Alphabet; Phonetics.

**E.** In music, the third note of the natural scale of C. *E* is two whole tones higher than C. See Key Signature; Pitch.

**E.** Class of British submarine. Begun in 1911, the *E* submarines were the latest in commission

when the Great War broke out, and were numbered 1 to 23. Their dimensions varied, but the usual armament was 4 to 5 torpedo tubes, two 3-in. guns: their surface speed was calculated as 16 knots, and submerged speed as 10 knots. See Submarine.

**E 3.** British submarine. She was commanded by Lieut.-Commander G. F. Cholmondeley, and was sunk in the North Sea Oct. 18, 1914. She was the first British submarine destroyed by enemy action during the Great War.

**E 11.** British submarine. Commanded by Lieut.-Commander Martin E. Nasmith, she took part in operations in the Heligoland Bight in 1914. On May 26, 1915, she forced her way into the Sea of Marmora, torpedoed a store-ship off Constantinople, and sunk other enemy craft, including a transport. For his share in these exploits Nasmith was awarded the V.C.

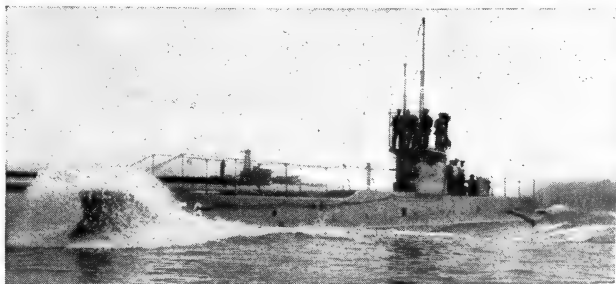
**E 14.** British submarine. She was sunk by gunfire off Kum Kale, Dardanelles, on Jan. 28, 1918; seven

of her crew were made prisoners, and her commander, Lt.-Comdr. G. S. White, was posthumously awarded the V.C. *E 14* was one of the submarines that in April-May, 1915, dived under minefields into the Sea of Marmora, and destroyed Turkish armed ships. Her commander, E. C. Boyle, received the V.C.

**E 15.** British submarine. On April 17, 1915, she grounded on Kephez Point while trying to get through the Dardanelles. Ten of her crew were lost, and three officers and 21 men taken prisoner by the Turks. Two picket boats from British warships on the night of April 18 blew up the submarine to prevent her falling into enemy hands.

**E 22.** British submarine. She was sunk by German warships in the North Sea, April 25, 1916. Two of the submarine's crew were rescued and made prisoner.

**E. & O.E.** Abbrev. for the commercial term errors and omissions excepted. It is commonly used when sending an account to a customer or client.



**E Class submarine.** One of the type in the British Navy built 1911-14  
Cribb, Southsea



**Ea.** God of Babylonian mythology. He is said to have arisen out of the Persian Gulf, bringing with him the elements of culture. He was the god of wisdom and of life, the trees of which grew under his protection in the Babylonian Paradise, which was watered by the rivers Euphrates and Tigris, created by him at the beginning of time. He was also known as the potter who moulded gods and men.

**Eade, SIR PETER (1825-1915).** British physician. He was born at Acle, Norfolk, Jan. 19, 1825, and



Sir Peter Eade,  
British physician

educated at Yarmouth Grammar School and King's College, London. He graduated M.D. at London University, 1850, and practised in Norwich for fifty years. He was president of the British Medical Association, 1874; sheriff of Norfolk, 1880-81; and twice mayor of Norwich. He was the author of Notes on Diphtheria, 1883; and Influenza, 1891; and part author of a report on the cattle plague in Norfolk, 1865. He also wrote on the topography of Norwich. He was knighted 1885, and died Aug. 12, 1915. See Autobiography, ed. S. H. Long, 1916.

**Eadie, DENNIS (b. 1875).** British actor. Born at Glasgow, Jan. 14, 1875, in 1899 he toured with the



Dennis Eadie,  
British actor  
Hugh Cecil

St. James's Repertoire Company, making his first appearance in London under George Alexander at the St. James's Theatre, Feb. 7, 1900, in The Prisoner of Zenda. He entered into management of the Royalty with J. E. Vedrenne in 1911, in the same year taking the part of Patent in the command performance of Money at Drury Lane, May 17. As John Rhead he made a success in Milestones, which was produced in 1912. On June 27, 1913, he appeared as Martin in the all-star performance of London Assurance, at the St. James's. In 1915 he played in The Man Who Stayed at Home. In 1920 he played in The Romantic Young Lady at the Royalty.

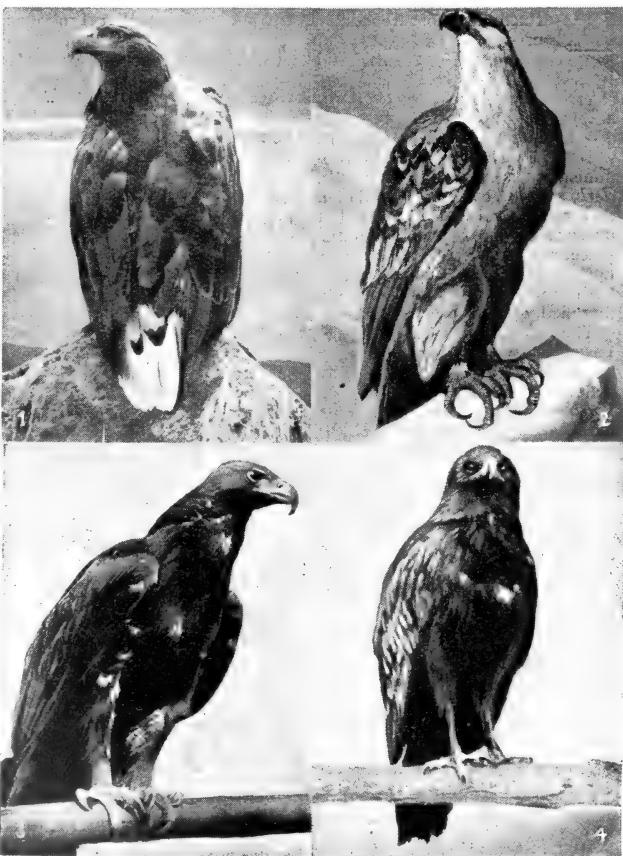
**Eadmer OR EDMER (d. c. 1124).** English historian. Brought up a monk at Canterbury, he became

the intimate companion of Archbishop Anselm. Elected to the archbishopric of St. Andrews, Scotland, 1120, he refused to be consecrated except by the archbishop of Canterbury, and on the Scottish king denying the jurisdiction of Canterbury, Eadmer remained in England, and eventually renounced his claims to the see. He wrote a life of S. Anselm and Historia Novorum—the latter an English history from 1066-1122. Both works were edited by M. Rule, for the Rolls Series, in 1884.

**Eads, JAMES BUCHANAN (1820-87).** American inventor. Born May 23, 1820, at Lawrenceburg, Indiana, he began life as a clerk at St. Louis, when quite a boy. Employment on a steamer on the Mississippi led him to the study of navigation, and in a few years he became a recognized authority on river engineering. In 1861, just after the outbreak of the Civil War,

he was entrusted by the Federal government with the work of building a fleet of warships for river service, a task quickly carried through. He was responsible for building the bridge across the Mississippi at St. Louis, and later for deepening and otherwise improving the entrance to that river; this was his greatest work. He died in the Bahamas, March 8, 1887, being then engaged on planning a canal across the isthmus of Tehuantepec. See Life, L. How, 1900.

**Eagle (Fr. *aigle*, Lat. *aquila*).** Group of large birds of prey, including some fourteen genera and a large number of species. The true eagles belong to the hawk family, of which they are the largest members. All have strong, curved beaks with sharp cutting edges, and the head has usually a flattened and rather snakelike look. The plumage is generally dark, and the wings are long and powerful.



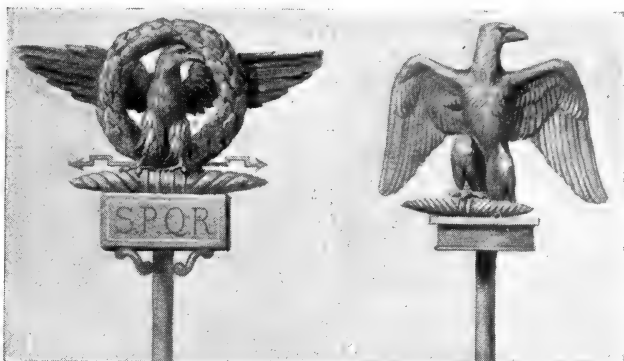
Eagle. Typical examples of this large bird of prey. 1. White-tailed sea eagle, found in the Hebrides. 2. Imperial eagle, a native of Asia and S. Europe. 3. Golden eagle, found in certain districts of the British Isles. 4. Spotted eagle, occasionally found in the British Isles in winter

All are exclusively carnivorous, and most of them eat carrion. They are found throughout Europe, Africa, Asia, and North America.

The most familiar member of the genus *Aquila* is the golden eagle (*A. chrysaetus*), which is not uncommon in Scotland and in the wilder parts of Ireland. The golden eagles seen in England have always turned out to be white-tailed species. The bird is about a yard in length, with dark brown plumage showing a tawny tinge at the neck. It lives mainly on hares, rabbits, and game birds, and will occasionally attack a lamb or young fawn. Its nest, made of sticks and often of a huge size, is usually built on a ledge of an inaccessible cliff. The white-tailed sea eagle (*Haliaeetus albicilla*) is found in the Hebrides. The spotted eagle (*A. maculata*) is a rare winter visitor. See *illus.* p. 990.

**Eagle.** Symbol in heraldry. It was employed by several nations before the beginning of heraldic science, notably by the Hittites, Persians, and Egyptians. In heraldry it is almost universally displayed full front, with expanded wings, but is shown in a great variety of positions, as close (wing closed), rising (wings elevated or displayed), volant or flying, trussing or preying (devouring quarry), and double-headed, in which form it was adopted by the Russian and Austrian empires.

From a Roman standard-symbol it became the emblem of the rulers of the Eastern Empire, from whom Charlemagne adopted it after his coronation at Rome in A.D. 800, thus making it the badge of the medieval empire. From this early form was evolved the later German imperial eagle, which, originally one-headed, is represented on the coins of the emperor Louis the Bavarian as double-headed, to typify the union of the royal and imperial dignities. This continued



Eagle. The bird as displayed on military standards. 1. Of the armies of Ancient Rome. 2. Of those of Napoleon I and Napoleon III

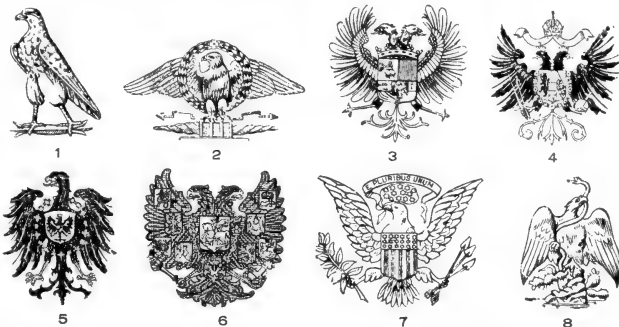
to be the basis of the arms of the Holy Roman Empire till its close in 1806. The Austrian Empire preserved the double-headed eagle. The Russian tsars assumed the double-headed form in 1472 under Ivan III, to signify their succession from the Greek emperors. The modern German Empire adopted the single-headed eagle on its formation in 1871.

The origin of the assumption of the eagle as a national emblem by the United States of America is obscure, but there is good reason to believe that it was adopted from Indian usage. Its images, carved in wood, or its stuffed skin, surmounted the council lodges of the Creek Indians, its feathers composed their war flag; and it was worshipped by the Natchez, Alanzas, and other tribes. The American eagle carries in its talons a bundle of arrows and an olive branch, bears on the breast a shield crossed by six red vertical bars, and from its beak issues a band with the motto *E pluribus unum*. The eagle was adopted by the Mexican Republic because of an Aztec legend that when the site of Mexico City

was discovered an eagle with a serpent in its talons was seen perching on a cactus plant. The alerion is a heraldic form of the eagle, without beak or legs.

**Eagle.** Name given to military standards employed in ancient Rome and in France under Napoleon I and Napoleon III. In Rome the eagle was traditionally believed to have brought the symbols of earthly power to King Tarquinius Priscus, and was first adopted as a military emblem in the second consulship of Marius (104 B.C.), when the older tribal standards were laid aside and the eagle, as the bird of Jupiter, was alone retained. It was at first made of wood, but later was cast in silver and bronze, with expanded wings, the model being of no very great size. Under the later emperors it was carried by the various legions, which were sometimes spoken of as eagles. Under the eagle the head of the reigning emperor was frequently shown.

The Napoleonic eagle, which was served out to regiments and vessels of war, was represented as gilded and crowned and perched on a thunderbolt. It was first issued on Dec. 3, 1804, the day after Napoleon's coronation, and the officers who received it took oath to "sacrifice their lives in defence" of the standard. Twelve Napoleonic eagles are preserved at the Chelsea Hospital, London, but the only naval eagle known is in the museum at Madrid. On the restoration of the Bourbons, the eagles in use were destroyed, but when Napoleon returned from Elba new eagles were issued. After Waterloo another destruction of eagles was ordered, and only one of those which had not been captured by the British—that of the Old Guard—was saved, remaining in possession of the officer who secreted it. The older Napoleonic eagles bore only the number of the regiment,



Eagle. Representations of this bird on the flags and standards of various nations. 1. Taken from an Egyptian coin of the time of the Ptolemies. 2. Ancient Rome. 3. Holy Roman Empire. 4. Austria. 5. German Empire. 6. Russian Empire. 7. U.S.A. 8. Mexico.

but those made in 1815 bore the legend L'Empereur des Français, and the names of the four principal engagements in which the regiment had taken part. The practice of carrying eagles in French regiments was restored by Napoleon III in 1852, but was once more abolished by the Republic in 1870.

**Eagle.** Gold coin of the U.S.A. value ten dollars, about £2 ls. 6d. Double-, half-, and quarter-eagles are coined. It bears a representation of the U.S.A. crest, an eagle, whence the name.

**Eagle.** Floating aerodrome of the British navy. She was built in England for Chile under the name of *Almirante Cochrane*, but the Admiralty acquired her and turned her into a floating aerodrome. Launched in 1918, she is 625 ft. long, displaces 30,000 tons, and her hull above water resembles a huge hangar with a flat roof upon which aircraft can take off and alight.

The first British naval ship of this name dates back to 1650. In 1776, when the third *Eagle* was lying off Governor's Island, near New York, a member of the American navy undertook to blow her up by means of a submarine-boat. He approached the *Eagle*, but his torpedo exploded before it could reach the vessel.

**Eagle.** American warship, the first of a class of 60 submarine chasers built by Henry Ford at Detroit. They are 200 ft. long, 25 ft. in beam, have a draught of 18 ft., and displace 500 tons. They have oil engines of 2,260 h.p., giving a speed of 18 knots. They carry two 4-inch guns and a depth charge projector. These craft were not completed early enough for use in the Great War, but the American authorities had previously built a large number of wooden submarine chasers of 17 knots speed and 110 ft. long, armed with 3-inch guns and depth charge throwers, over 30 of which operated in the Mediterranean. Their base was at Corfu.

**Eaglehawk.** Mun. bor. of Victoria, Australia, in Bendigo co. It is 5 m. by rly. N.W. of Bendigo, and lies in a rich gold-mining district. Pop. 6,998.

**Eagle Hut.** THE. American Y.M.C.A. centre, in Aldwych, London. Opened on Sept. 3, 1917, it continued as a "home from home" for American troops in the metropolis until Aug. 25, 1919, when it was taken over by the Metropolitan Police Force as a training centre for police recruits. It was later demolished when this site was built on. During the two years it was open, two million meals were served in the hut, the daily average being 3,000. Entertainments of

varied character were provided, and sight-seeing trips organized. The *Eagle Hut* had a staff of about 800 voluntary workers, chiefly women. The hut was open day and night, and was equipped with 410 beds. See Y.M.C.A.

**Eagle Owl** (*Bubo*). One of the largest members of the owl family. Occasionally found in Great Britain, it is over 2 ft. long, with handsomely mottled brown plumage and very conspicuous ear-tufts. It is nocturnal in habit, is bold and savage, and preys upon game birds, rabbits, and young fawns. See Owl.



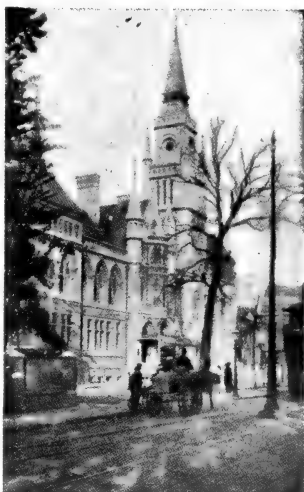
**Eagle Pass.** Town of Texas, U.S.A.

Situated in Maverick co., it is about 165 m. S.W. of San Antonio, and is an important stock-breeding centre with considerable trade in coal. Pop. 3,200.

**Eagles' Nest.** Hill in co. Kerry, Ireland. Overlooking the Upper Lake, about 6 m. S.W. of Killarney, it rises conically to a height of 1,100 ft. Its bare, precipitous summit formerly sheltered eagles. From the lake beneath a remarkable echo can be heard.

**Eakins, THOMAS** (1844-1916). American painter. Born July 25, 1844, Eakins studied at Pennsylvania and Paris, painted many studies of American life and sports, and was professor of painting at Pennsylvania Academy. He died on June 25, 1916.

**Ealing.** Parl. and mun. bor., Middlesex, England. It is 5½ m. W. of Paddington by the G.W. and Met. Dist. Rlys., there being stations at Ealing Common, Ealing Broadway, and West Ealing. Until the middle of the 19th century it was a village on the road from London to



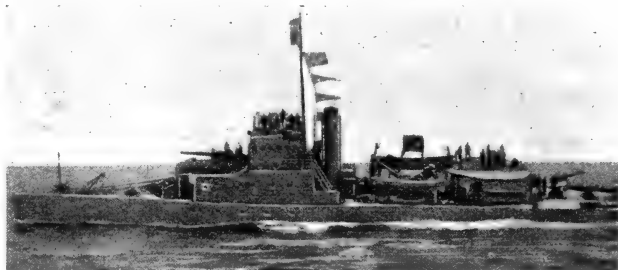
Ealing. The municipal buildings, opened in 1887

Slough and Windsor, and was frequented by highwaymen.

With the advent of the rly., about 1840, Ealing's modern progress began, and in 70 years it was covered with shops and houses, and extended into W. and S. Ealing. Corporate existence began in 1863, and since 1901 it has been a borough. Its chief buildings are the Victoria Hall and the adjacent town hall. Its open spaces include Ealing Common and Walpole Park. Perivale, a pretty rural part of Ealing, has a tiny church, probably 800 years old. The corporation owns the electric lighting works. The chief churches are S. Mary's, the parish church, and Christ Church. In 1920 a movement was started to unite Ealing with Chiswick, Brentford, Hanwell, and Greenford into one county borough. One member is returned to Parliament. Pop. (1921) 67,753.



Ealing arms



Eagle. Type of swift oil-driven submarine chaser designed for the U.S. navy

## THE EAR: ITS ORGANISM & FUNCTIONS

T. S. A. Orr, M.D., Aural Surgeon, Westminster Dispensary

*The Ear, Deafness, and Deaf and Dumb, with shorter entries, e.g. Cochlea, form a group of related articles, another such group being those on the Eye, Blindness, etc. See also Anatomy; Man; Surgery*

The ear is the organ of hearing, more strictly the end organ of the eighth cranial nerve. It has two functions: it collects and concentrates the vibrations of air known as sound waves and transmits them to the nerve in order that they may be perceived and interpreted in the brain; and it harbours the chief organ of balance or equilibration.

The ear is divided into three parts: (1) The outer ear composed of (a) the auricle, or pinna, applied to the side of the head, concave on its outer aspect, and leading into (b) the external auditory meatus, a narrow tube passing inwards to the drum of the ear. The outer ear is composed chiefly of a framework of cartilage covered by skin. The skin contains hair only in the male, but in both sexes it has sweat glands. Wax in the ear, due to dried sweat accumulating in the meatus, often causes sudden and severe deafness and can be seen as a dark plug well down the meatus. In man the pinna is small and of little importance.

(2) The middle ear is a small cavity in the side of the skull separated from the outer ear by the ear drum. It has a chain of minute bones, the hammer, anvil, and stirrup bones, which run across it and carry sound waves from the drum to the oval window, a small hole, closed by a membrane and leading into the inner ear.

### Relation of Throat and Ear

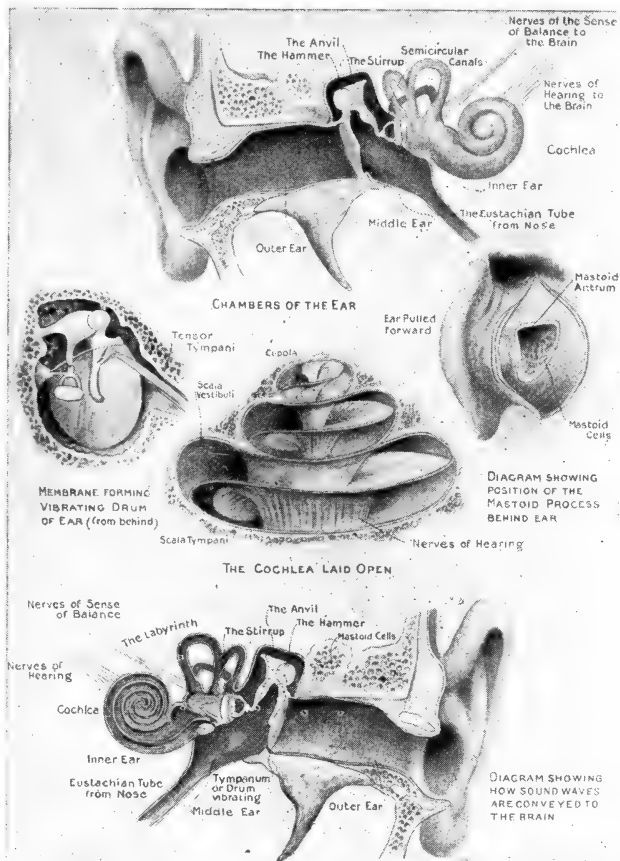
The cavity in addition transmits the nerve of expression, the facial, and an important nerve of taste, the chorda tympani. It has in front a tube that connects it with the throat, the Eustachian tube, and behind and above it communicates with the air cells in the mastoid process, the projection of bone seen behind the auricle. Inflammatory processes starting in the throat may, therefore, pass up through the middle ear to the mastoid process. As this is in very close relationship to the brain, the danger of all middle ear inflammation is apparent. In health the Eustachian tube allows air to pass into the middle ear in order that the pressure of air inside the drum may equalise the atmosphere pressure.

(3) The inner ear is a cavity embedded in the skull deeper than the middle ear, and communicates with it through the oval window, a membrane like the drum of the ear intervening. It is filled with fluid, called perilymph, submerged in which are two hollow structures

composed of membrane—the cochlea and the semicircular canals. These again are filled with fluid, called endolymph. The cochlea is a spiral tube, and has been compared to a snail-shell. The nerve of hearing terminates in it, in a multitude of minute hairs, which float in the endolymph. Sound waves are carried through the outer and middle ear and put the membrane closing the oval window in motion, which is communicated to the fluid filling the inner ear. The movement in this fluid is communicated through the membrane composing the cochlea to the fluid contained therein, in which the termination of the nerve of hearing floats, the stimulus thus given to the nerve being perceived in the brain as sound.

The semicircular canals are three tubes, at right angles to one another, semicircular in shape, and joined together. Like the cochlea they are filled with fluid, having fine hair-like nerve terminals floating in it. Any movement of this fluid stimulates the nerve. The fluid is set in motion by any change in the position of the body. The stimulus so produced is carried to the brain and enables it to judge of our position in space and automatically to adjust our muscles accordingly.

**FUNCTIONS OF THE EAR.** The cochlea is the only part of the inner ear concerned in hearing. It is absent in fishes; first appears in amphibia and reptiles, increases in birds and attains its maximum perfection in mammals. The semicircular canals, on the other hand, are entirely concerned in the balance of the body. They can be extirpated in birds and mammals without causing any perceptible depreciation of hearing; destruction of



Ear. Sectional diagram showing the construction and delicate mechanism of the ear

the cochlea, on the contrary, produces deafness.

Sensations of sound are distinguished by three characters—loudness, pitch, and quality. Loudness depends on the extent of movement of the sound waves. The dog is able readily to detect sounds inaudible to man, his master. The ear in this animal and in many other mammals is large, its pinna has a considerable degree of mobility, its meatus can be narrowed or widened at will, and the area in the brain set apart for hearing is extensive. The pitch of a sound depends on the number of vibrations occurring per second. It is possible to detect a sound whose pitch is so low as to be produced by 16 vibrations per second; or so high as to be produced by 30,000. There is reason to believe that some animals can hear sounds of a higher pitch, but the sensory cells along each side of the fish, which correspond with the mammalian ear, are only capable of perceiving vibrations of very low frequency—6 per second. The quality of a sound depends on the manner in which the vibrations succeed one another. If these are irregular a noise is produced, if regular and orderly, a musical note.

Equilibration is the second function of the ear. An individual normally balances himself by the sense of sight, his muscles, and the semicircular canals in the inner ear. When flying through the air the aviator's eyes may be useless, as when in a cloud or in darkness. With them he may not know whether he is upside down or downside up. In an unstable and rapidly-moving machine his muscle sense is of little avail. It is pre-eminently on his ear mechanism that he relies to maintain his equilibrium, the semicircular canals alone giving him the accuracy necessary to guide so delicate a mechanism as the flying machine. The bird is continually in the position of the aviator, and in this animal the canals are remarkably well developed. The movement of the endolymph inside them stimulates the delicate hair-like endings of the nerves which float therein. As the canals are arranged like three adjacent sides of a cube, the fluid in them moves in a different way with each position in space. The unusual agitation in this fluid—produced in one who is unaccustomed to flying or sailing—gives rise to disagreeable sensations, well-known as air-sickness or sea-sickness.

There is a close connexion between the semicircular canals and the eyes. Stimulation of the former produces quick jerking movements in the latter, known as nystagmus.

This peculiar movement of the eyes may be seen in a railway passenger looking at the passing scenery. It also occurs in some nervous diseases and is frequent in coalminers, when the individual affected is stationary, but is asked to look far over to one or other side. When the physician wishes to investigate the condition of the semicircular canals in disease, or in men who wish to become airmen, he brings on nystagmus by rapidly rotating the individual to be tested, for about twenty seconds in a revolving chair. The fluid in the canals is set in motion and it continues to move after the body has stopped. The nerves in the canal are strongly stimulated, and owing to their connexions with the eye nystagmus is produced. It should last nearly half-a-minute. If it is absent, if it does not last so long, or if it is unduly prolonged, the canals are at fault, and the capability of the body to balance itself is not satisfactory.

**Earby.** Urban dist. of West Riding, Yorkshire, England. It is 6 m. S.W. of Skipton, on the Midland Railway. Pop. 6,032.

**Earl.** Title in the British peerage, ranking third. The French equivalent is *comte*, and the German is *Graf*. The wife of an earl is called a countess, a reminder of the days when earl and count were syn-

onymous. His eldest son bears his father's second title; the other sons are known as the Hon., the daughters as Lady So-and-So. Including Scottish and Irish there are over 200 of them in the peerage.

Earl is the oldest title of nobility. Under the form *eorl* it first appeared in England in Anglo-Saxon times, being used for those of noble blood as distinguished from the *ceorls*. In the 11th century, Canute set rulers over parts of the country. He named them *jarls*, a Danish word, but this became *earl* in England. This idea remained, and after the Conquest most of the counties had an earl as the head of their administration, he being entitled to the third part of its revenues. These earls were sometimes called after their residence, but gradually it became general to call them after their county. The office was not at first an hereditary one, but some earls managed to make it so. They corresponded to the counts in France and other parts of Europe.

Gradually the title became a mark of rank rather than a mark of office. Earls who had no connexion with the rule of a county began to

be created in the time of Edward III, and following the first creations of the higher ranks of duke and marquis, they took their present place in the peerage, the title carrying with it the right to a seat in Parliament. The premier earl of England is the earl of Arundel, a title held by the duke of Norfolk. Of those who have no higher title, the earls of Shrewsbury (1442), Derby (1485), and Huntingdon (1529) are the senior. The Prince of Wales holds the earldom of Chester and the Scottish one of Carrick. In Scotland the earl of Crawford is the senior earl, dating from 1089. *See* Peerage.

**Earle, JOHN** (c. 1601–65). English divine. Born at York, he was educated at Merton College, Oxford. He was made rector of Bishopston, Wilts, tutor to Charles, prince of Wales, and chancellor of Salisbury. In 1643 he became dean of Westminster, in 1662 bishop of Worcester, and in 1663 bishop of Salisbury. He was the author of *Microcosmography*, or, A Piece of the World discovered in Essays and Characters, 1628, a work valuable for its reflection of contemporary life, and for its pointed humorous style and insight into human nature. Earle died at Oxford, Nov. 17, 1665, and was buried in the chapel of Merton College.

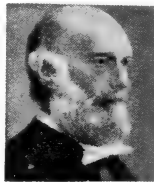
**Earle, JOHN** (1824–1903). British philologist. He was born Jan. 29, 1824, near Kingsbridge, Devon, and was educated at Magdalen Hall, Oxford. From 1849–54 he was professor of Anglo-Saxon in the university of Oxford, and again from 1876 until his death, Jan. 31, 1903. Ordained in

1857, he was for many years a clergyman at Bath and prebendary in Wells Cathedral. His best-known work is his *Philology of the English Tongue*, 1871, his most important an edition of *Two of the Saxon Chronicles*, 1865.

**Earl Marshal.** In England the eighth great office of state. He is head of the Heralds' College and has various ceremonial duties. Since 1672 the office has been hereditary in the family of Howard, duke of Norfolk. On the death of the 15th duke, 1917, his brother, Lord Edmund Talbot, was appointed deputy earl marshal, the 16th duke being a minor. Until 1386 the title was marshal. With the lord high constable he was judge of the court of chivalry. The office



Earl's coronet



John Earle,  
British philologist  
*Fraddie & Young*





Earl Marshal of England. The 15th duke of Norfolk in the robes of office

of earl marschal (formerly great marschal) of Scotland was hereditary in the Keith family until the attainder of George, the 10th earl marschal, in 1716, when it was abolished.

**Earl's Court.** District of London in the met. bor. of Kensington. To modern Londoners

Earl's Court is synonymous with exhibitions, which, from that of the Fisheries Exhibition, in 1884, down to 1914, delighted millions of patrons. The Great Wheel was removed in 1906. The exhibition grounds were taken over on Oct. 15, 1914, as a clearing station for war refugees, and a permanent residence for a certain number. Schools and workshops were established, and nearly 100,000 refugees, including Belgians, coloured men born under the British flag, Serbs, and Italians, were given shelter until 1919. Later it was used as a centre of the Disposal Board.

**Earlsfield.** Eccles. and residential dist. of London. Within the met. bor. of Wandsworth, it is 2 m. S.W. of Clapham Junction by the L. & S.W.R. Pop. 18,286. See Wandsworth.

**Earlston.** Parish and small market town of Berwickshire, Scotland, formerly Ereildoune. It stands on Leader Water, 72 m. S.E. of Edinburgh by the N.B.R., and is a noted angling resort. There are traces of the old tower of Thomas the Rhymer (d. 1299), whose remains lie in the churchyard. The industries include dyeing and the manufacture of tweeds and gingham. Cattle and horse fairs are held. Market day, Mon. Pop. 1,749.

**Early.** JUBAL ANDERSON (1816-94). American soldier. Born at Franklin, Virginia, Nov. 3, 1816, and educated at West Point, he practised as a lawyer, 1838-52. Though a supporter of the maintenance of the union he threw in his lot with the Confederates on the outbreak of the Civil War. At the first battle of Bull Run he commanded a brigade, and at Fredericksburg and Gettysburg a division. A succession of defeats by Sheridan and Custer, in 1864, led to his being relieved of his command in 1865, yet competent authorities regard him as the best

Confederate general after Lee and Jackson. He was the author of A Memoir of the Last Year of the War for Independence, 1867, and other military and historical writings. He died at Lynchburg, Virginia, March 2, 1894.

**Early Closing.** Movement among shopkeepers and others to secure shorter working hours on week days. In 1886 the Shop Hours Regulation Act limited the working hours for young persons under 18 employed in shops to 74 hours a week, while the Shop Hours (Amendment) Act of 1893 contained provision for the appointment of inspectors.

In 1904 another Shop Hours Act introduced the principle of closing by local option by a two-thirds majority. The shop-assistants' charter, however, is the Shops Act of 1912, which consolidated previous legislation and gave a compulsory half-holiday on one day of the week.

During the Great War the need for economy of coal and the lighting restrictions led, in 1916, to the issue of a compulsory closing order for shops at 8 p.m. on four nights of the week, and 9 p.m. on Saturday; these hours were very generally shortened still further in some localities. This order remained in force until Aug., 1920. In 1920 a private bill to bring about compulsory closing (with few exceptions) at 7 p.m. and 8 p.m. on Saturday reached the report stage, but the third reading was prevented by lack of time. Considerable opposition to this and earlier bills was due to the fears of small traders in competition with large firms.

The organization mainly responsible for the movement is the Early Closing Association, founded in 1842. Its offices are at 34-40, Ludgate Hill, London, E.C.

**Early English.** Style of architecture originating in the reign of Henry II, and prevalent throughout the 13th century. The term is also used for a period of literature covering about the same years as the architectural one (see English Literature).

Architecturally it has been called the "lancet" style or period, from the resemblance of the slender pointed arch, its leading characteristic, to a surgeon's lancet. Norman work had retained the round arch of Romanesque pattern; and Early English inaugurated the new era of Gothic architecture by substituting the pointed for the round. In essence, Early English indicates a revolt against the slightly uncouth forms of the Romanesque style in England, and a striving

after more elegant forms of construction and ornament. Vaulted roofs in stone take the place of the old flat timber roofs. Windows are lengthened and crowned by the lancet arch; piers are formed of clustered columns, each having its own cap, but united under one capital from which spring the trefoiled pointed arches of the vault; mouldings are deeply undercut, often with dog-tooth ornament; the entire design becomes more elegant and flexible.

The choir of Lincoln Cathedral (12th-13th century) is one of the earliest and most beautiful extant examples of Early English architecture. The choir and Lady Chapel of Southwark Cathedral, still preserved, were built in 1207; the stone-webbed vault of this fine Early English church is an example of the style at its best. In other English cathedrals portions of Early English work are still preserved, notably at York Minster, Westminster Abbey, Salisbury, Durham, and Ely. The plan of churches built in this period shows the absence of the semicircular apse which was characteristic of Norman and Romanesque structures, and the substitution of a square east end; and the transepts generally divide the length into two almost equal parts. It is noticeable that the Early English style was coincident with a movement within the Church towards simplicity and reticence. The Reformed Orders, especially the Cistercians, were largely responsible for an architectural development which, beginning with a lightness and beauty unknown to the Norman period, was to attain, in the Decorated and Perpendicular styles which followed it, an ever-increasing magnificence. See Architecture; Gothic Architecture: also illus. p. 531.

**Earmark.** Term used in English law to signify a sum set apart for a particular purpose. For example, when executors have to pay a legacy to a person, say at 21, and they set aside and invest for that purpose some particular fund apart from the general investment of the estate, it is said to be earmarked for the legacy, and cannot be applied to anything else. The term originated in the practice of marking beasts by cuts in the ear, for identification purposes.

**Earn.** Loch of Perthshire, Scotland, about 11 m. W. of Crieff. Lying 317 ft. above sea level, it is  $6\frac{1}{2}$  m. long and  $\frac{3}{4}$  m. wide, with a maximum depth of 287 ft. Trout are plentiful. The lake occupies a rock basin scooped out by the ice sheet which crossed Perthshire



Earn. View of the loch looking eastward from Lochearnhead

during the Ice Age. Scott's Legend of Montrose introduces Ardvorlich House, on its shore, as Darnlin-varach.

**Earn.** River of Perthshire, Scotland. It issues from Loch Earn and flows E. for 46 m. across Strathmore to the Tay, which it enters 2 m. N.E. of Abernethy. Salmon, trout, and other fish abound. It is subject to floods, but small vessels, not exceeding 50 tons, can approach Bridge of Earn.

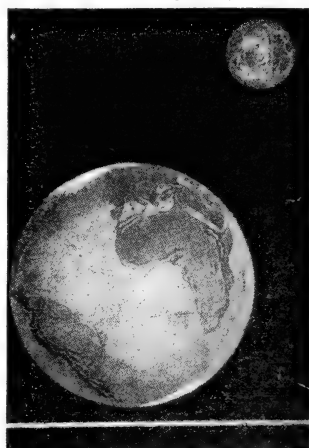
**Earnest.** Name given to a sum of money paid on account in order to show the good faith of the buyer. Such payments are recognized in English law, and also in other codes, the fact that such has been made being taken as proof that a contract has been entered into. Strictly speaking, earnest is not part

payment, although it has some similarity with the arrha of Roman law which was such. See Contract.

**Earring.** Object attached to the ear, usually by passing it or a subsidiary ring or hook through the lobe. Its purpose may be amuletic, ceremonial, or ornamental. Untraceable in the prehistoric stone age, earrings appear early in the metal age in the form of plain bronze and gold bands or wires, sometimes twisted, sometimes with one end clubbed. In the Swiss lake-dwellings, which have yielded hundreds of specimens, occurs a double-coil design which survives among the Sumatra Battas. In ancient Egypt the simple hoop developed complex forms, with animal head terminals and gems, partly under foreign influence.

Except in Babylonia and Assyria these ornaments were usually confined to women. Many O.T. references to such rings properly concern nose-ornaments; that mentioned in Isaiah 3 was an amulet. The development of design is observable in Mycenae, Troy, Etruria, and S. Russia, through the winged sirens of Greece and the pearls and other jingling jewels of imperial Rome to the massive pendants of the Byzantine age.

Dormant during the Middle Ages, the use of earrings revived after the Renaissance. Mediterranean mariners introduced the single plain gold hoop to the seafaring world, where it is still in favour. In modern India rings may have a

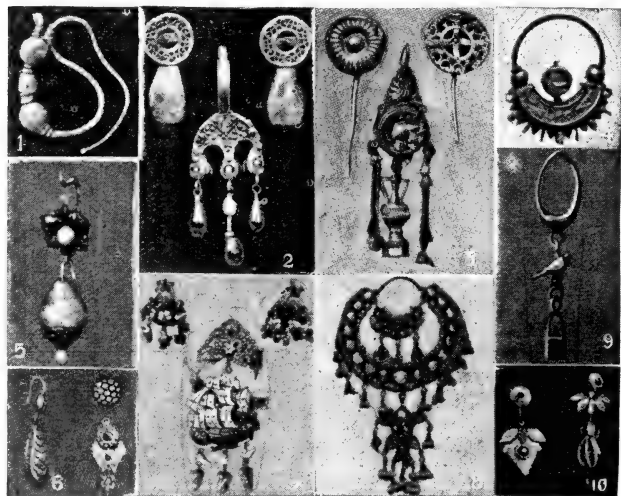


Earth. Diagram to show the relative sizes of the earth and its satellite, the moon. The white band below indicates the distance between them on a scale where the width of the band equals the earth's radius

hundred pendant pearls, with supporting chains over the top of the ear, or the ear may have 12-13 borings, each with a separate ornament. Garo women sometimes wear 50 brass rings in each ear. Silver is preferred by Syrian women; other materials are the iron wire of the Dinka, shell of the Hotentots, cuttlefish bone of Formosa, and tortoiseshell of the Solomon Islands. See Mutilation Customs.

**Earsdon.** Parish and urban dist. of Northumberland, England. It is 4 m. N.W. of North Shields, and the inhabitants are employed in the local collieries. Pop. 10,568.

**Earth.** Name given to the planet on which we live. It is also used for the soil and other constituents of the earth's crust. The solar system comprises the sun, planets, satellites, comets, asteroids, meteorites, and the rings of Saturn. The earth is a planet with the moon



Earring. 1. Ancient Egyptian, mounted with beads. 2. Gold with jacinth drops, on either side pierced earrings with emerald matrix drops, all three Roman. 3. Ancient Greek gold earring set with jewels and enamels, c. 400 B.C. (centre); small Roman earrings of gold. 4. Enamelled Byzantine, set with pearls. 5. 16th century Italian, pearl set in gold. 6. Left, turquoise, c. 1840; right, modern Italian set with seed pearls; above, turquoise, c. 1840. 7. 16th cent. Italian, shaped like a ship in full sail; on either side, 16th cent. Venetian pearl pendants for earrings. 8. Modern Indian, set with diamonds and emeralds. 9. Phoenician earring from Tharros. 10. Modern Italian, gold set with seed pearls

From Chats on Old Jewellery, by MacIver Percival; and Jewellery, by Cyril Deaconport

By courtesy of T. Fisher Unwin and Methuen & Co.



**Earth.** Three views of the earth showing the three mountain ridges which meet in the plateau of Antarctica. These ridges indicate the shape which is being assumed by the earth's crust as the earth itself cools and contracts

as its satellite. Many solar systems form the universe.

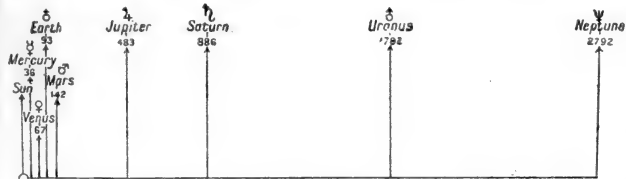
The earth's rotation, or spin, upon its axis through the poles is the cause of the rhythmic succession of day and night and the steady

the path of the pendulum and was not underneath it again until a day had passed. The floor turned round the pendulum in a day because the earth rotated.

The axis of rotation through the

regions are tilted now away and later towards the light. The angle of tilt  $23\frac{1}{2}^\circ$  determines the arctic and antarctic circles ( $90 - 23\frac{1}{2} = 66\frac{1}{2}$ ), which are the edges of the areas which have no sunrise at their midwinter and no sunset at their midsummer.

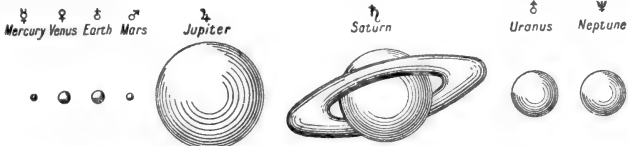
At midsummer, in England and similar latitudes, the sun is  $47^\circ$  (twice  $23\frac{1}{2}$ ) higher in the sky than at midwinter. At the equinoxes the sun rises due east and sets due west, and day lasts for 12 hours; in England in the summer the sun rises north of east and sets north of west, and day varies from 12 to 18 hours; in winter the sun rises south



**Earth.** In this diagram the distances, in millions of miles, of the earth and the other planets from the sun are indicated along the bottom line

pulsation of the oceanic tides. The direction of rotation from west to east causes the sun to rise in the east, and the cyclonic planetary winds to swirl in different directions, anti-clockwise in the northern and clockwise in the southern hemisphere.

The fact that the earth rotates is demonstrated by Foucault's pendulum. Foucault in 1851 suspended a pendulum from the dome of the Pantheon in Paris and started it swinging above a mark on the floor. A pendulum always swings in the same path. The mark along the floor moved away from

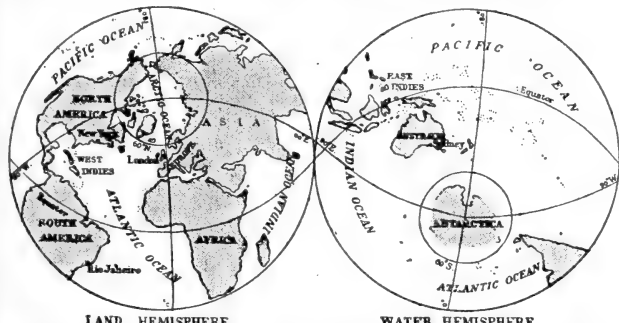


**Earth.** Diagram showing the relative sizes of the earth and the other seven planets. The earth is one of the four smaller planets. Note the relatively immense sizes and distances of the four major planets

poles tilts through an angle of  $23\frac{1}{2}^\circ$  from the vertical towards the line joining the centres of the earth and the sun. Sunlight reaches the earth in rays parallel to the line of centres; consequently the polar

of east, sets south of west, and day varies from 6 to 12 hours. The tilt of the earth's axis is therefore responsible for the seasons, and for the fact that variation in mean monthly temperature through the year follows the same rhythmic curve for all places on the earth, differing only in amplitude from place to place. Like the other planets the earth has a spherical shape, rotates upon an axis inclined to the plane through which it revolves round the sun in an elliptical orbit, and receives light and heat from the sun.

Owing to its rotation the earth is not a perfect sphere, but has a bulging belt round the equator and a flattening at the poles, so that it is an oblate spheroid. This bulge is a reminder of the way in which at an early stage in its career the earth, then much larger in diameter, had a greater bulge which eventually broke away from the earth in fragments, which later coalesced to



**Earth.** The world in hemispheres. The land hemisphere has its centre approximately at London. The Arctic basin is antipodal to the Antarctic continent; Africa is antipodal to the great basin of the Pacific. The water hemisphere includes Argentina, Australasia, the East Indies, and the south-east corner of Asia

form the moon. This process repeated on a small scale the method by which the earth itself was formed from the sun. The earth's diameter is 7,900 m., less than a hundredth part of that of the sun. The earth is the third planet in order from the sun, Mercury, the nearest and smallest planet, being 36 million miles while the earth is 92½ million miles from the sun, and Neptune, the most distant, is 2,775 million miles from it. The earth rotates once in 23 hrs. 56 mins., the sun in 25 days, and Jupiter in 9 hrs. 55 mins. While the revolution of the earth round the sun occupies a year, Mercury only takes 88 days and Neptune takes 165 years.

#### The Moon and the Earth

The whole solar system is held together by the influence of gravity. While the sun is very hot and the moon quite cold, the earth still retains within it a certain amount of heat which tends to be dissipated through space. The moon is without an atmosphere, but the earth and Mars have a gaseous envelope surrounding them, the troposphere. The moon causes eclipses of the sun, the wave movements of terrestrial waters called the tides, and reflects a small quantity of solar light and heat to the earth, but the main external source of supply of energy to the earth is the sun. The earth, however, only receives a very small portion of the total radiant energy, light, heat, electricity, etc., which streams continuously into space from the sun.

The earth is a rigid body, approximately twice as rigid as steel, in that it resists compression, yet although the interior is not fluid, it is fluidible and will flow when opportunity offers, as in lava streams.

#### Hydrosphere and Lithosphere

The earth is a cooling body, and therefore is very slowly becoming smaller. The geometrical solid which combines a maximum of surface area with a minimum of volume is a tetrahedron, which has four corners, four faces, and six edges. Because the earth's crust is attached to a shrinking interior the crust crinkles into folded mountains which have adopted the tetrahedral outline. One corner is Antarctica, the opposite face is the Arctic Ocean. Three edges, the Andes, the African mts., and the ridges of Malaysia and Australasia, point towards the Antarctic Corner. The remaining three edges are formed by the mountain ridges which run east and west in the northern hemisphere.

The hydrosphere, or water covering of the earth, consequently tends to form four basins; the best

marked of these is the Arctic Ocean. Of the total surface of 196½ million sq. m., 141½ million sq. m. are water, most of which is found in the Water Hemisphere, which has its pole close to Antipodes Island and includes Australasia, Antarctica, and small portions of South America and S.E. Asia. The maximum depth of the hydrosphere does not reach 6 m. The hydrosphere is the source of the water which in the form of rain, ice, and flowing streams tends to wear down the surface of the lithosphere or solid earth to a uniform slope which would leave only the tetrahedral edges as mountain ridges; this process is most marked all round the Arctic Ocean in the great plains of Canada and Russia. Although it is probable that the bulk of the lithosphere is of the same composition, the known diversity in the composition of the outside crust is responsible for the minor variations of ridge and valley which are infinitesimal in relation to the earth's bulk (1,000 ft. compared with 8,000 miles, i.e. roughly 1:40,000).

#### Flux of Atmospheric Conditions

The earth is the home of man. In common with the forms of life which provide his sustenance man exists on the earth because of the atmosphere. His yearly and daily round is regulated by the motion of the earth. The annual revolution, with the consequent variation in the earth's tilt relative to the sun, causes the seasons and the well-marked differences between the tropical and polar belts. In relation to these differences the tetrahedral conformation produces variations in atmospheric circulation which govern the several climatic differences which cause the weather to vary from place to place.

The net result of these differential conditions is the production in the neighbourhood of the tetrahedral ridges of the northern hemisphere of areas where the atmospheric conditions are in a state of continuous flux. It has been demonstrated that man reaches and retains his highest development in response to such a kaleidoscopic environment. It is not an accident that modern civilization in its highest expression is found on the edge of the Alpine ridge, where the northern slope abuts on the junction of the Arctic and Atlantic basins. See Planet. B. C. Wallis

**Earth.** Term used in several senses besides that of the name of a member of the solar system. Two only need be noted here, one in connexion with electrical and magnetic phenomena, and the other with the so-called rare earths.

The chief rare earths are cerium, terbium, and ytterbium, occurring in small quantities in Scandinavia, the Urals, America, and Australia, and yielding radium, the discovery of which has revolutionised the theories of the constitution of matter.

In 1600 Gilbert showed that the earth was a magnet; the magnetic poles corresponding approximately to the geographical poles. The cause of this magnetisation of the earth is unknown, but it has been observed to vary in strength with the appearance of spots on the sun. That there is an intimate connexion between solar phenomena and magnetic storms on the earth has long been known. These magnetic storms are of such strength as to interfere with and often prevent the transmission of telegraphic messages. They are notably severe at times of brilliant displays of the aurora borealis. See Magnetism; Telegraph and Telegraphy.

**Earth Colours.** Pigments universally employed before the introduction of oils. The cave men used red, yellow, black, and white for their crude but spirited drawings of animals, and the ancient Egyptians and Greeks resorted to similar though somewhat more numerous pigments. Honey or one of the gums was probably the binding medium. The earth colours include the ochres, umbers, sienna brown, and terre verte.

**Earth Density.** This has been determined experimentally by several physicists, beginning with Cavendish. The mean density as calculated most recently by C. V. Boys is 5.5268; or rather more than five and a half times that of water. See Cavendish Experiment.

**Earthenware.** Name given to all pottery that is not translucent. It includes Faience, Delft, Stoneware, and such modern makes as Granite ware, Silicon, Semi-porcelain, and so forth. It may be glazed or unglazed, the terracotta of the Greeks, flooring tiles and building blocks, or the Majolica and Enamelled wares all coming under the general term. Its origin is lost in antiquity, dating back before the age of metal working to a primitive culture when plaited baskets were encased in clay for cooking food. See Pottery; also illus. pp. 139 and 2083.

**Earth-House.** Primitive underground structure of the early metallic age, especially in Scotland. Normally it is a round or rectangular chamber of unhewn masonry, with a beehive roof, beneath an artificial mound. Frequently one or more chambers are approached by stone-

lined, stone-paved corridors, often planned with a sharp bend, as at Tealing, Forfarshire, where it is 80 ft. long, 5 ft. 8 ins. high, with cup-markings. On the moor of Clova, Aberdeenshire, about 50 of these so-called Picts' Houses lie within two sq. m. At Skerrebrae, Orkney, several groups of chambers—one 21 ft. by 11 ft.—were reached from a common corridor. At Cairn Conan, Arbroath, the underground chamber lay near surface foundations, pointing to its probable use for refuge and storage in connexion with surface dwellings. The cultural range of the associated remains—querns, spindle-whorls, horn and bronze implements, rough pottery, Samian ware—resembles that of the Broch. Similar structures occur in Ireland and Cornwall. See Underground Dwellings.

**Earthly Paradise, THE.** Poem or cycle of narrative poems by William Morris, published in four parts from 1868–70. The stories, chosen from classical and medieval sources, are supposed to be told by a miscellaneous group of 14th century story-tellers, banded together in search of that earthly paradise which gives its name to the whole. The first poem in the series, *The Life and Death of Jason*, was published as a separate volume, 1867.

**Earth Movement.** Ever since the outer rocky layer, or crust, was formed on the surface of the earth, it has been crumpled, folded, and otherwise disturbed. Areas have been elevated or depressed within historic times, as may be seen along the sea coasts. Thus, at the Temple of Serapis at Pozzuoli, near Naples, a pavement now below present beach-level, with several neighbouring pillars, still upright, which bear marks of boring by shell-fish that never live above high-water mark, indicates both movements. At more remote periods, sea-beaches have been raised many feet above present beach-level; on the other hand, depression of land has caused areas of thick vegetation to be turned into submerged forests.

Simple movements of elevation have raised great land-masses to form plateaux. When the strain on the strata becomes too great, fractures take place, the lines where they break being known as faults. In this way large areas are sometimes let down to a level lower than the surrounding country, and rift valleys have been formed. The valley of the Jordan is an example. The Dead Sea, the Red Sea, Nyasa and Tanganyika, and other lakes in E. Africa, lie in such areas. Earth stresses producing horizontal

movements result in crumpling and folding of strata, and, on a large scale, in the formation of mountain chains. The Alps are folding mts. Rock-beds may be arched, forming anticlines, or depressed into troughs, forming synclines; complications in bending may result in compound flexure or fan-structure. See Earthquake; Fault.

**Earth-Nut Cake.** Artificial feeding stuff. It is prepared from the underground fruit of the leguminous plant variously known as earth-nut, ground-nut, monkey-nut, or pea-nut (*Arachis hypogaea*), after the oil has been extracted. In the decorticated form, which is better known than the undecorticated, the husk has been removed, and it is then a good substitute for decorticated cotton-cake. Percentage composition: Water, 10.43; oil, 8.17; albuminoids, 48.32; digestible carbohydrates, 22.99; fibre, 4.67; ash, 5.42.

**Earth Pillar.** Pillars of clay capped by stones. In an area consisting of clay or soft rock contain-



**Earth Pillar.** Example of this curious nature formation at Euseigne, Switzerland. It is caused by large stones, acting like umbrellas, protecting the rock beneath, after the softer material has been washed away by rain

ing large stones the softer materials will be readily washed away by the rains, but the stones, acting like umbrellas, will protect the clay or soft rock immediately beneath them. In this way pedestals capped by stones are formed. See Geology; Rock.

**Earth Plate.** Metal plate, frequently of copper. Buried in the ground, to it the end of an electric conductor is secured. In telegraphy an earth plate is employed at each end of a conductor. See Circuit.

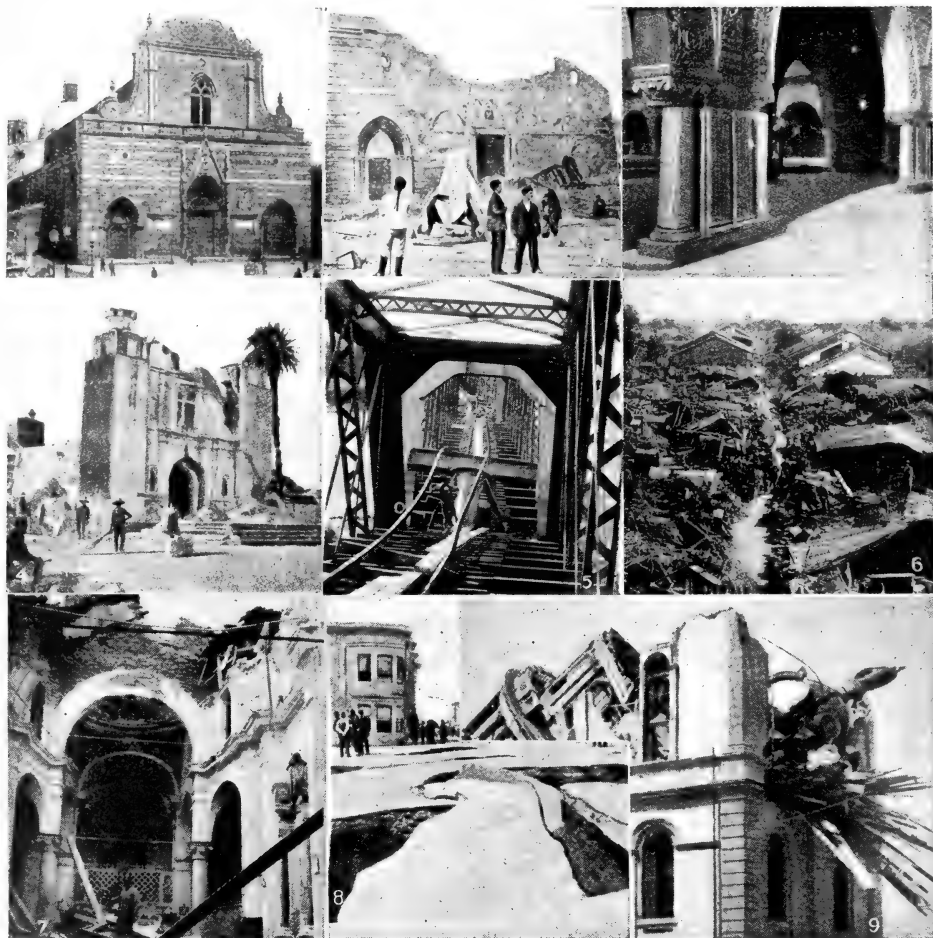
**Earthquake.** The crust of the earth, the outside layer of solid rock, is not always still; it is subject to strain and stress due to the

cooling of the earth, to its revolution, and to the attractive force of the other heavenly bodies. The crust not being homogeneous, these strains produce varied results in different areas. Large sections of the crust have sunk below the general level of the neighbouring portions; thus, for example, the basin of the western Mediterranean is a depression caused by sinking of this nature during remote geological eras. The edges of such depressions are lines of weakness in the crust, and are usually marked by the existence of extinct or active volcanoes. In the western Mediterranean area are the volcanoes Stromboli, Etna, and Vesuvius, as well as the extinct volcanoes of Central France.

These lines of structural weakness in the outer crust of the earth sometimes give opportunity for earthquakes, which occur when a hidden segment of the crust breaks away from its original location. The shock produced by the sudden fracture sets up vibrations in the solid matter of the earth's crust, and these vibrations, waves or tremblings, travel long distances and produce movements in buildings, bridges, rly. lines, etc. Near the volcanoes in Italy there have been two great recent earthquakes: the Neapolitan earthquake of 1857, in which more than 12,000 lives were lost, and that of Messina in 1908, which cost 77,000 lives. In Sept., 1920, earthquake shocks occurred in N. and Central Italy, causing hundreds of deaths and much damage. The modern study of earthquakes, the science of seismology, dates from 1857.

Earthquakes usually arise at no great depth below the land surface, and the stability of the "outer skin" of the earth depends partly upon its angle of slope. Earthquakes are not to be expected where there are extensive plains, but wherever the slope of the land is very steep the rocks tend to slip and give rise to earthquake shocks. The coast lands of the Pacific are usually tilted very sharply; deep water is close to the sea shore and high mts. rise close to the coast; consequently, Japan is a land of earthquakes, which also occur in New Zealand near Wellington, while San Francisco was devastated by the earthquake and subsequent fire of 1906. For a similar reason there have been severe shocks near the base of the Himalayas, e.g. at Shillong, Assam, in 1897. The highest mts. of the world are located roughly along two lines—in America from N. to S. close to the Pacific shores, in the Old World in a west-east direction





**Earthquake.** Examples of damage wrought by modern earthquakes. 1. Facade of Messina Cathedral before the earthquake of 1908. 2. As it appeared afterwards. 3. Capitals of columns displaced at Leland Stanford Jr. University, California, 1906. 4. Cathedral destroyed in Guatemala's City, 1918. 5. Wrecked railway bridge near Gifu, Hondo, Japan. 6. Ruined street in Gifu. 7. Interior of the church of Calcinaja, near Pisa, destroyed in Sept., 1920. 8. Street rent asunder in San Francisco, 1906. 9. Collapsed tower at Santa Rosa, California, 1906

from Italy to Burma. Count de Montessus de Ballore tabulated the records of over 170,000 earthquakes, and found that all but 5 p.c. occurred near these two mountainous axes.

Seismology owes much to Japanese interest; during seven years, 1885-92, over 8,000 shocks were recorded in Japan, most of them happily of small dimensions; yet in 1891 a severe shock left exposed a new escarpment which extended 50 m. and attained a height of 20 ft. The San Francisco earthquake was marked by a vertical displacement which in places amounted to 10 ft. and which extended for over 250 m. Usually the shock lasts for a little longer than a minute; the amplitude of the vibration diminishes with distance from the origin.

The seismograph, or earthquake recorder, is a solid pillar set up solidly in the ground at a distance from all chance causes of surface vibrations in the earth, and so arranged that every vibration in the earth's crust is communicated through the pillar to a recording pen. From the automatic records of three stations the seismologist determines the time, character, and place of origin of the earthquake.

In Britain occasional earthquakes cause little damage beyond the breakage of ornaments thrown from their shelves and of pictures detached from their hooks; but in areas liable to these disturbances the landscape may be permanently altered by the formation of scarps and landslips, rly. lines and fences may be broken and displaced side-

ways, buildings may become heaps of rubble. Great waves may be generated in the ocean.

In earthquake areas great attention must be paid to the stability of buildings; they should be low upon a broad foundation, so that the swaying roof does not move far beyond the outside limits of the foundations. It used to be thought that the typically light bamboo house of the Japanese was developed in consequence of the frequency of earthquakes, but the thick, heavy, solid roofs of these houses show that the lightness of the walls is not due to fear of earthquakes. If Japanese domestic architecture owes any of its characteristic features to the frequent earth-waves, it is in the shape and lowness of the buildings

**Earth-shine.** Illumination of the moon by reflected light from the earth. It can be observed with greater or less distinctness, according to locality and atmospheric conditions, when the portion of the moon illuminated by the sun appears only as a slender crescent. The earth-shine on the new moon was successfully photographed in Feb., 1895, at the Lick Observatory by Prof. Barnard, who thus described it: "The earthlit globe stands out beautifully round, encircled by the slender crescent. All the seas are conspicuously visible, as are also the other prominent features, especially the region about Tycho. Aristarchus and Copernicus appear as bright specks." Humboldt endorses an observation that the light reflected thus on the moon changes in colour according to the region of the earth which reflects it. See Moon.

**Earth-star** (*Geaster*). Genus of fungi, of the natural order Gastromycetes. They are distin-



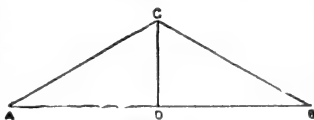
Earth-star. Specimen of the fungus showing its pointed segments

guished from the puff-balls (*Lycoperdon*) by the two outermost layers splitting from the apex into several pointed segments which expand and give the plant its stellate form. The numerous species grow upon the ground.

**Earthwork.** Ancient stronghold defended by earthen mounds. There are several thousands in England and Wales. Promontory forts, utilising natural defences, are either coastal or inland. They developed into cliff castles. Hill-forts are characteristic of neolithic Britain. Plateau forts are on flatter ground. When round or oval they are pre-Roman, but often were used successively by neolithic, Celtic, Roman, Saxon, and Norman occupants. There is a good earthen hill-fort on Midhill Head, Midlothian, but Scottish strongholds are mostly of stone. See Caesar's Camp; Dyke; Rath.

**Earthwork.** In engineering, the excavation and disposal of materials which can be loosened with-

out blasting. Railway engineers, when running their surveys, endeavour to fix formation levels which will balance excavation and embankment, preventing useless



Earthwork. Diagram illustrating angle of repose

dumping and too much borrowing from outside areas.

The cubic contents of a cutting or embankment relatively to its average depth is governed by the angle of repose of the material under the conditions to which it will be exposed when the work is completed. If dry sand is poured on to a horizontal surface A B (see diagram), it forms a conical pile, the slopes of which make an angle of about  $35^\circ$  with A B. As long as the heap remains dry, the angle is unchanged, and the heap is stable. Therefore angle C A B (= angle C B A) is the natural angle of repose. Addition of water reduces the friction between the particles, and the heap spreads out until a condition of equilibrium is re-established, the angle of repose being reduced to  $22^\circ$ - $26^\circ$ .

The angles of repose of other substances are approximately: damp clay,  $45^\circ$ ; wet clay,  $16^\circ$ ; earth deposited in layers and rammed,  $60^\circ$ - $70^\circ$ ; damp earth piled in bulk,  $45^\circ$ ; dry earth,  $30^\circ$ ; wet earth,  $16^\circ$ - $18^\circ$ ; gravel,  $45^\circ$ - $50^\circ$ . Assuming that proper provision is made for drainage, a slope in which A D : C D ::  $1\frac{1}{2}$  : 1 is safe for average earthwork in both cutting and embankment. To allow for the effect of heavy rain, it may be prudent to make the slope more gentle than this, as extra work done in the first instance is less expensive. The shoulders and toes of embankments should be rounded off, and the slopes covered with grass, which protects the earth against the loosening influence of rain.

#### Ditches and Drainage

If there be any likelihood of water flowing down into a cut from higher ground, a ditch is dug near the edge to intercept the water and carry it to a point where it can pass away without doing damage. In clay it is often necessary to cut Y-shaped ditches in the direction of the slope and fill them in with lump chalk, clinkers, etc. The arms of a Y catch the water, which flows down the leg into permanent drains along the foot.

A cutting is usually excavated in successive lifts or layers, each opened out by deep trenches traversing the whole length of the cutting. The faces of the trenches are attacked by men working about 5 ft. apart, and extended laterally till they meet the slopes or one another. For very large cuttings a system of terracing is sometimes adopted, and work proceeds on a number of longitudinal benches on both sides at different levels, each provided with its own temporary way. A cut is made near the centre line, and widened out to three or four times its original width, after which a second cut is sunk under the first. While this is being extended, the limits of the cut above also are receding. The process is repeated till formation level is reached. The same system of benches is useful on side-long ground, i.e. where a notch has to be cut along the face of a hill.

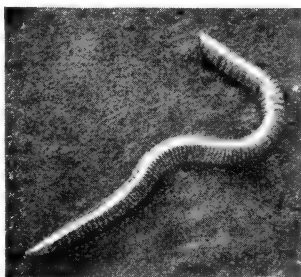
#### Economic Removal of Spoil

Mechanical excavators are employed wherever the scale of work justifies their use. With hand-work, 14-60 cubic yds. per man per day can be loosened by picks; and 10-30 cubic yds. shovelled, according to the nature of the ground. Removal of the spoil is effected most economically by barrows over distances up to 500 ft.; by two-wheeled carts, 500 ft.-1,700 ft.; by four-wheeled carts, 1,700 ft.-3,500 ft.; and by wagons on rails for longer hauls.

Railway embankments are generally formed by tipping over the end, and allowing the debris to find its own angle. Settlement of the material by consolidation must be allowed for to the extent of  $\frac{1}{2}$  to  $\frac{1}{4}$  of the height of the pile. If the earth be spread in layers, subsequent shrinkage is small. To open the road quickly it may prove economical to run a temporary trestle across a fill and dump earth from it to both sides. The stringers are removed as the earth reaches them; the uprights and cross-bracings are left in position and help to give solidity.

If the maximum density be required, as for the embankments of reservoirs and behind retaining walls, earth is spread in layers a few inches thick, and well rammed. See Embankment; Engineering.

**Earthworm.** Segmented worm living in the soil. Their rounded shape and the short bristles with which the segments are provided enable the worms to push their way through the soil and to form burrows. They eat their way also, and derive their food largely from the vegetable matter contained in the soil swallowed. When this has



**Earthworm.** The common species, a valuable agent in fertilisation

been extracted, the soil, after being reduced to fine powder in the intestine, is discharged at the mouth of the burrow in the familiar worm-castings.

In his *Formation of Vegetable Mould through the Action of Worms*, 1881, Darwin estimates that in an acre of average garden land there are about 53,000 earthworms, and that every year about ten tons of soil pass through their bodies, with the result that they spread fresh soil on the surface at an average rate of an inch in five years. In this way they are continually turning over the soil, and their burrows give access to light and moisture. The destruction of earthworms is therefore an economic mistake.

Although without eyes, earthworms dislike light and only emerge from their burrows after dark, unless flooded out by storms. Even when they have emerged, they usually keep their tail in the hole ready for instant withdrawal if alarmed. They are in the habit of plugging the mouth of the burrow with leaves or small stones; and vegetable matter is drawn in for future consumption. They can certainly smell and taste, and it is probable that they can appreciate the vibrations caused by sound.

Earthworms are hermaphrodite, and impregnation is mutual in the union of the sexes. The eggs are deposited in a kind of horny cocoon, which is formed by a secretion round the swollen ring which may be noticed on the body of an adult and is often mistaken for the scar of an old injury. When a worm is cut in two by a spade, the two halves often survive and reproduce the missing parts.

**Earwig.** Family (*Forficulidae*) of orthopterous (straight-winged) insects, which vary considerably from other members of the order. The fore wings are modified into elytra, and the hind wings—which are rarely used—are folded like a fan. They are readily recognized by the pincer-like appendages on the

abdomen. The female sits on her eggs and watches over her young for some time. It is generally supposed that these insects are garden pests and feed on plants and fruit; but this is very doubtful. Recent observers maintain that they are largely carnivorous. *See* Insects.

**Easel.** Upright wooden frame of varying size and strength with a rest for the artist's canvas or board. The rest may be adjusted to any convenient height by means of a stop-slide at the back. The word easel (Dutch *ezel*, Ger. *Esel*) comes ultimately from Lat. *asellus*, little ass (dim. of *asinus*), meaning that which carries or supports. *See* Painting.

**Easel Picture.** Term applied in art criticism to works small enough to be painted on the easel. The name might be given to all cabinet and panel pictures, and most examples of genre and landscape, but not to distinctly large canvases, even though painted at the easel.

**Easement.** Term used in English law for what is called servitude in Scots law and in other legal systems. There must be two pieces of land (tenements), and the owner of the one, called the dominant tenement, has a right over the other, servient tenement. Thus, the owners of Whiteacre (dominant) have a right to use a footpath which runs across Blackacre (servient); this is called a right of way. Other common easements are right of light, or the right to prevent obstruction to windows; drainage; support for buildings—e.g. where one house leans on another.

If the dominant and servient tenements come into the same ownership, the easement vanishes, and if the ownership is again divided

a fresh grant of easement is required. Easements are acquired by grant from the servient owner to the dominant owner: but a grant will be implied in some cases, where a grant of land is made which would be useless without an easement—

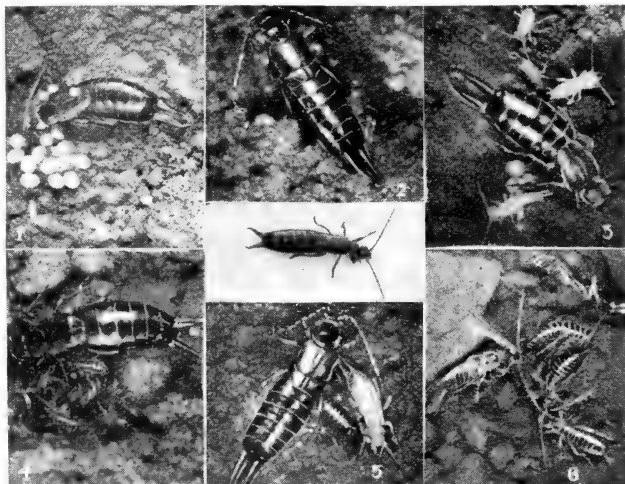


**Easel.** Example of a studio easel

e.g. if A grants to B a field in the middle of A's land, and there is no public road to the field, there is an implied grant of a right of way over A's land. Easements are also acquired by long user. *See* Prescription.

**East.** One of the cardinal points. When the observer faces north the east is on the right hand. At an equinox the sun rises due E. and sets due W.

As a noun East is used for Asia and the eastern part of the world generally. That part which lies, roughly, east of Germany is known in Britain as the Near East, the Middle East, and the Far East—China and Japan. Churches are usually built so that the worshippers face the east, and at the east end the altar is always placed.



**Earwig.** Stages of life history. 1. Female earwig rearranging her eggs in the soil. 2. Assisting the hatching-out process. 3. The young earwigs, silvery at first, emerge after 15 days. 4. The family now increased to 48. 5. As they grow, the young earwigs moult to silvery white again. 6. Starting life at a month old. 7. Earwig, natural size. Figs. 1 to 6 are enlarged two diameters

**East, Sir Alfred (1849-1913).** British painter and etcher. Born at Kettering, Dec. 15, 1849, he studied



Sir Alfred East,  
British painter  
Elliott & Fry

at the Glasgow School of Art and at Paris under Tony Fleury and Bouguereau. He became a landscape painter of pronounced individuality, though with a strong sympathy with Corot. He was elected A.R.A. in 1899 and R.A. in 1913; was chosen president of the Royal Society of British Artists in 1906, and was knighted in 1910. Few landscape painters are so well represented in municipal art galleries. Evening in the Cotswolds is at Hull, Autumn in the Ouse Valley at Oldham, The Silent Somme and Autumn at Manchester, Gibraltar from Algieras at Liverpool, Hayle from Lelant at Birmingham, The Golden Valley at Leeds, An Idyll of Spring at Preston, Autumn in the Valley of the Seine at Leicester, and Autumn in England at Brisbane, while at Kettering he left a collection of his works which was opened in 1913. He is also represented at Pittsburgh and Chicago, Budapest, Venice, Milan, and the Luxembourg. He wrote *The Art of Landscape Painting in Oil Colour*, 1906; and the posthumously published *Brush and Pencil Notes in Landscape*, 1914. He died in London, Sept. 28, 1913.

**East Africa.** General term applied to that part of the African continent which includes British East Africa, i.e. Kenya Colony, Uganda Protectorate, and the Zanzibar Protectorate, Tanganyika Territory, and Portuguese East Africa. See Kenya Colony; Uganda Protectorate; Zanzibar Protectorate; Tanganyika Territory; East Africa, Portuguese.

**East Africa, CONQUEST OF.** British operation during the Great War. The campaign falls into two parts, desultory and indecisive operations throughout 1914 and 1915, and the conquest of the German colony by the British and their allies in 1916 and 1917. In the former period the British were in the main on the defensive.

On Aug. 13, 1914, a British cruiser bombarded Dar-es-Salaam, destroyed the wireless station, and by sinking the floating dock and a ship made the port temporarily useless. On land there were attacks by both sides on the frontier posts, especially on the Uganda side of the colony; there was also some

fighting on the lakes and on the Rhodesian border. On Nov. 4 the British, reinforced by a white battalion, the 1st Loyal Lancashires, attacked Tanga. They took it, but their losses were very heavy and they were compelled to retreat to their ships, which carried them back to British soil. Longido was another failure.

On Jan. 2, 1915, the British occupied Jassin, a German port. On Jan. 19 the Germans returned to it with 2,000 men, and the garrison surrendered. Following this the British retired from German soil, but soon they cleared the Germans from the Victoria Nyanza, took the island of Mafia, and on Feb. 28 declared the coast of the colony to be in a state of blockade. On June 23 they captured Bukoba on the Victoria Nyanza, and on July 11 destroyed the Königsberg, which had run up the Rufiji river. The main task, however, was still almost unattempted, and although the Germans were cut off from the outside world, their position was by no means hopeless. Their colony, which was intact, was defended by a strong force, well-trained and well led, and this was continually raiding British posts, especially those on the Uganda rly. Throughout it was under von Lettow-Vorbeck.

In the autumn of 1915, the serious nature of the task being by then realized, Sir H. Smith-Dorrien was sent out to take the chief command, till then in the hands of Brig.-Gen. J. M. Tighe. His health, however, was unequal to the task, and General Smuts took his place. On Feb. 19, 1916,

he arrived at Mombasa, and from that event the conquest really dates. Troops for the campaign had been raised in S. Africa, and he had soon something over 30,000 men under him. In addition, the Belgians were preparing to march on to the German soil.

From Mombasa, the British base, the best way into the German colony was through the gap of Kilimanjaro, the alter-

native being an attack, as at Tanga, from the coast. Smuts decided on the former, and in March his force succeeded in forcing the defences of the gap. One division attacked in front, while the other made a detour. There were several encounters, but the plan worked well and soon the Germans were retreating rapidly; their main body got clear, but only by the narrowest margin of time. Smuts moved his headquarters to Moschi and prepared for another sweep.

The new operations began in April, three divisions being employed, while other forces, Belgian and British, began to enter the colony from the W. One division marched into the interior, took Kondoa Irangi, where it was attacked by 3,000 Germans on May 10, and made the Germans anxious for the safety of their main line of rly. The main force operated nearer the coast. In the valley of the Pangani river the German askaris, aided by the thick bush, fought well, but they could not prevent the occupation of Wilhelmstal, Handeni, and other posts. The rly. to Tanga was also seized, and minor actions, one or two naval, made the hold of the British on the N.W. part of the colony secure. Across it and around the Victoria Nyanza small but useful successes were also recorded.

By this time the main enemy force was concentrated in the Ngura Hills; consequently this was the next objective. The 2nd division meanwhile had reached one of the main objects of the campaign, the line of rly. running from Dar-es-Salaam right across the land, and in July about 100 m.



East Africa. Map to illustrate the campaign which ended in the conquest of the German colony

of this was British. Important operations were the British occupations of Tanga (July 7), Mwanza (July 12), and Dodoma (July 30). All around forces were closing in on the Germans, whose one line of retreat was to the S. Early in Aug. Smuts set his main force moving again. It attacked in several places, and one after another the defended positions were taken. By the 18th the British force was at Dakawa, where the Wami is crossed. The 2nd division came along the rly. from the W. and the result was the German retreat on Mrogoro. An attempt was made to surround and destroy the foe there, but it failed, and again pursuer and pursued pressed S.

The Germans, who were by no means routed, put up a succession of fights, and once, at Kirsaki, they had the better of the exchanges. However, they could not stop the advance, which won an additional advantage by the surrender on Sept. 4 of Dar-es-Salaam. The other ports were quickly occupied, and the enemy was by the end of Sept. confined to the district between the Rufiji and Portuguese territory, where another foe was preparing to receive him.

The 1917 campaign opened well. The British reached Kilimbawe on Jan. 5 and surrounded a German force on Jan. 24. One of the great tasks of this campaign was the crossing of the Rufiji river. This was accomplished on June 5, 1917, and the area at the disposal of the enemy was again steadily contracted. The Germans were in two main bodies, while smaller detachments were occasionally troublesome. They fought hard, especially in the Kilwa district, but on Nov. 28 one of the main bodies surrendered. The other, under von Lettow-Vorbeck, crossed about the same time into Portuguese territory and the colony was cleared.

The concluding operations, which were conducted by General van der Venter, included a British success near Manunga, May 5, 1918, the occupation of Malema, June 13, and the surrender of von Lettow's forces, Nov. 14. The British casualties approached 20,000, and the loss in animals was enormous. See Tanganyika; consult Three Years of War in East Africa, A. Buchanan, 1919; My Reminiscences of East Africa, von Lettow-Vorbeck, 1920.

**East Africa, PORTUGUESE, OR MOZAMBIQUE.** Portuguese colony, bounded on the N. by Tanganyika Territory, on the W. by Lake Nyasa, the Nyasaland Protectorate, Rhodesia and the Transvaal, on the S. by the Zululand portion

of Natal, and on the E. by the Indian Ocean. The colony stretches along the coast from Cape Delgado to the Rovuma. From the coastal swamps the land rises gradually to forested hills and the African plateau. Area, 428,132 sq. m. Pop. 3,120,000. •

The colony comprises territories directly administered by the State, and others under the control of the Mozambique and Nyasa Companies. The first are divided into six districts—Lourenço Marques, Gaza, Inhambane, Quilimane, Tete, and Mozambique. The Mozambique Company is responsible for an immense block of territory in the centre of the colony, including the Manica and Sofala districts, whilst the Nyasa Company administers the northern territory between the river Rovuma, Lake Nyasa, and the river Lurio.

The whole country is extremely rich in tropical products and mineral wealth, and is capable of great economic development. The chief products are sugar, nuts, copra, rubber, vegetable oils, wax, and ivory. There are two important rlys. from Lourenço Marques to the Transvaal, and from Beira to Bulawayo in Rhodesia. Railways are under construction from Beira, Quilimane, and Mozambique to the Nyasa districts, and from Porto Amelia to Lake Nyasa. The principal commercial centres are Ibo, an ancient trading port N. of the fine natural harbour of Pemba Bay; Porto Amelia, on Pemba Bay; Mozambique, the original capital of the colony; Quilimane, an undeveloped but well-situated port; Chinde, situated on the only navigable outlet of the Zambezi river and the principal port for the Nyasaland Protectorate; Beira, the chief port and capital of the Mozambique Company's territory; Sofala, an ancient and decayed harbour; Inhambane, a small port of local importance; and Lourenço Marques, the chief port and capi-



East Africa. Map of the large and productive Portuguese colony, also known as Mozambique

tal of the colony, situated on Delagoa Bay.

Mozambique was visited in 1498 and 1502 by Vasco da Gama, and in 1505 by Albuquerque, who established it as a Portuguese province. During the height of the Portuguese power considerable progress was made in the exploration of the territory. In the 18th and early part of the 19th centuries it became a stronghold of the slave trade. In 1875 and in 1885-91 disputes arose with Great Britain regarding the precise boundaries of the Portuguese territories around Delagoa Bay and in Mashonaland, Matabeleland, and Manicaland, which were settled by arbitration on July 24, 1875, and by the Anglo-Portuguese Convention of 1891.

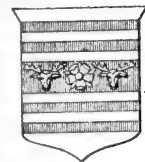
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**East Anglia.** One of the kingdoms into which England was divided from the 6th to the 9th century. It embraced the present counties of Norfolk and Suffolk, and the name suggests that its



founders were Angles. The first East Anglian king about whom anything definite is known is Raedwald, who died about 620. His successors were in turn the vassals of Northumbria, Mercia, and Wessex, until the Danes invaded their land and killed their King Edmund in 870. In the 10th century also there were East Anglian kings, but they were only underlings of the English kings, as were the earls who ruled the land subsequently. To-day East Anglia is used loosely to describe the district between the Wash and the Nore.

**Eastbourne.** County borough and watering-place of Sussex, England. It stands on the English Channel, with Beachy Head on the W. and is 66 m. S.S.E. of London by the L.B. & S.C. Rly. The many attractions include a fine parade, nearly three m.



Eastbourne arms

long, running right along the sea front, with its gardens, known as the Meads. There are a pier and pavilion, golf links, and provision for tennis, croquet, and other sports, as well as baths, while the South Downs, with their old-world villages, provide pleasant opportunities for walking. The open spaces include Devonshire, Gildridge and Hampden Parks, while there are some fine hotels and ample accommodation for visitors. Much of the ground belongs to the duke of Devonshire, who has a residence, Compton Place, here. The chief buildings are the fine block built for municipal purposes, and the Princess Alice Memorial Hospital.

The chief church is St. Mary's, the old parish church of the village of East Bourne, which is about a mile inland. The other churches are modern, but some of them are fine buildings. The Lamb Inn is interesting, and there is a redoubt and a martello tower. There are many schools, the chief being Eastbourne College. Eastbourne, which only became a borough in 1883, is governed by a mayor and corporation, and gives its name to a division sending one member to Parliament. Early in the 19th century it consisted only of three hamlets, but the discovery of its advantages as a seaside resort quickly brought fame and size to it. Pop. (1921) 62,030.

**Eastcheap.** London street extending from Gracechurch Street and Fish Street Hill to Great Tower Street, E.C. Owing its name to a butchers' market held here as early as the time of King John, and

later removed to Leadenhall, the thoroughfare has varied in both length and name, but was known as Eastcheap from about the time of Henry III to the 16th century. About 1831 the W. end disappeared, as did the church of S. Michael's, Crooked Lane, in the new London Bridge improvements, and the E. end became known as Eastcheap and Little Tower Street. When the street was widened in 1884 the old name was restored for the whole of it. The site of the Boar's Head Tavern, Eastcheap, mentioned by Shakespeare, is marked approximately by the statue of William IV at the junction of King William Street and Gracechurch Street.

**Easter.** English name for the eccles. festival commemorative of the Resurrection of Jesus Christ.



Eastbourne. The beach and sea front, showing the Meads, and looking towards Beachy Head

The feast, the most important in the Christian year, known as Ostern in Germany, in other countries is called by modifications of the Greek and Latin *Pascha*, which derives from the Aramaic *Pischa* and Hebrew *Pesach*=Passover, the name of the Jewish festival which coincided with the Crucifixion. Thus we have in Welsh *Pasg*, Italian *Pasqua*, Spanish *Pascus*, and French *Pâques*. While applied especially to Easter as being the feast of feasts, the word *Pasch* is extended to other occasions. The sacrifice of Christ, typified by the paschal lamb slain at the Passover, was celebrated as well as His Resurrection; there was a *Pasch* of the Cross as well as a *Pasch* of the Resurrection.

Celebrated generally in Christendom since the 2nd century, though for varying periods, Easter is a movable feast, and its occurrence governs the dates of the preceding Lent and the festivals following it. It was long observed as a special time for baptism, for the reconciliation of penitents and the release of prisoners, for the distribution of alms and for offerings to the clergy. Both the Roman

Catholic and Anglican churches expect their members to receive holy communion at Easter, and have special services for Sunday, Monday, and Tuesday. Many special ceremonies also pertain to the celebration of Easter in the Roman Catholic Church. British Nonconformists, who in the 17th century formally repudiated the keeping of this festival, now commonly observe it. A number of pagan customs associated with the vernal equinox survived at Easter until the Middle Ages, and others were adapted by the Christian Church. In regard to the giving of Easter or pasch eggs, the idea that the egg symbolises resurrection is of a comparatively modern origin. Eggs, having been forbidden as food during Lent, were restored at Easter.

The secular importance of Easter is that it governs law, university, and school terms and business arrangements generally. Since the 8th century in Western Christendom, Easter Day has been celebrated on the first Sunday after the first full moon, or after the 14th day of the month, following March 21.

Thus it cannot fall before March 22 nor after April 25. The 14th of the calendar moon, or eccles. full moon, which regulates the date of Easter, falls, however, usually on the 15th or 16th of the real moon. Reviving an ancient and oft-repeated proposal, Lord Desborough, at a conference of the associated chambers of commerce in 1920, moved, on behalf of the London chamber, a resolution in favour of a fixed date for Easter.

Both the origin of the word Easter and the time of its observance have been subjects of controversy. Following the Venerable Bede, the derivation of Easter from *Eastre* or *Eostre*, the name of a Teutonic goddess of spring, has been commonly accepted. The dispute in the early Church as to the date of Easter was between the Christians of Asia Minor, who were called Quartodecimans because they kept the Resurrection on the third day after the 14th of the Jewish month Nisan, on whatever day of the week it fell; and the Western Church, which maintained that Easter should always be held on the Lord's Day following the 14th. The latter prevailed, and the



Council of Nicaea, 325, fixed the Sunday for universal observance. But for many centuries the difficulty of adjusting the Julian calendar to the Jewish system, and of finding the true date of Easter, was acute. As the reform of the calendar in 1582 was not accepted in the East, the Eastern Churches still keep Easter on a different date from that in the West. See Calendar; Metonic Cycle; Pass-over.

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**Easter Island** OR **RAFANUI**. Lonely volcanic islet of the S. Pacific. It is 2,300 m. W. of Chile, to whom it belongs. Area about 50 sq. m.; alt. 1,970 ft.; lat. 27° 7' S.; long. 109° 20' W. It was discovered on Easter Day, 1722, by the Dutch admiral, Roggeveen, although its discovery is claimed for Davis, the buccaneer, in 1686. The few inhabitants are of Polynesian descent; Cook, visiting it in 1774, reported them as having the lobes of their ears extended almost to their shoulders. But its chief interest lies in some 500 ancient statues or torsos, stone huts and sculptural rocks, with pictographs (undeciphered) and Megalithic remains. Most of the carved faces are very high, one measuring 37 ft. Examples of these sculptures are to be seen at the British Museum. Attempts at deciphering some incised wooden tablets, called hylloglyphs, have not been altogether successful. The island is now a Chilean convict station. Pop. about 100. During the Great War it came into notice in connexion with the commerce-destroying raids of the German auxiliary

cruiser, Prinz Eitel Friedrich, which towed some of her captures to the island and there sunk them. The crews of certain ships taken by the cruiser were left on the island, Dec., 1914-Jan., 1915. See Te Pito Te Henua or Easter Island, W. J. Thomson, 1891 (for Smithsonian Inst.); The Mystery of Easter Island, Katherine Routledge, 1919.

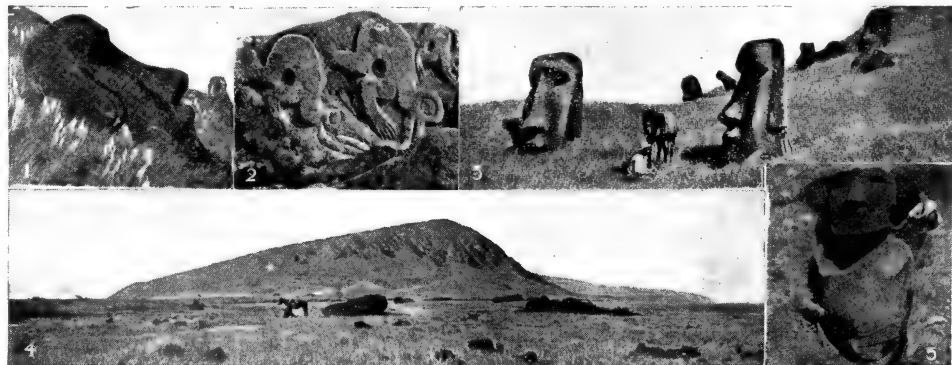
#### **Eastern Bengal and Assam.**

Province of India from 1905 to 1912. On Oct. 16, 1905, Eastern Bengal and Assam was constituted from the territories formerly administered by the Chief Commissioner of Assam, together with the Bengal divisions of Dacca and Chittagong, and the districts of Jalpaiguri, Dinajpur, Rangpur, Malda, Bogra, Rajshahi, and Pabna. It had a total area of 111,569 sq. m., including the native states of Hill Tippera and Manipur, and a pop. of 30,961,459 (census of 1901). The capital was Dacca. This partition was revoked in 1911, when George V announced at the Delhi durbar the reconstruction of Bengal with the presidency of Bengal, the lieutenant-governorship of Bihar and Orissa, and the chief commissionership of Assam. The new division of territory came into force April 1, 1912.

**Eastern Cadet.** Name given to certain British officials. They are sent out to the British possessions in the East, Ceylon, Straits Settlements, Federated Malay States, and Hong-Kong, to manage the civil affairs of those countries, much as the Indian civil service manages those of India. The service is entered by competitive examination, the same as that for first-class clerkship in the home civil service and the Indian civil service. The examination is usually held every August. Candidates must be British subjects, between 22 and 24 years of age. See Civil Service.

**Eastern Church.** Term for the Greek, as distinguished from the Latin or Western Church. It is applied specifically to the Greek Catholic or Eastern Orthodox (Russian) Church, and generally to the churches of E. Europe, Asia, and Africa, including the Nestorian or East Syrian, Armenian, Jacobite or West Syrian, Coptic (Egypt), Abyssinian, Malabar (India), and Maronite (Lebanon) Churches. The Eastern Church flourished in the East Roman Empire, claims a greater antiquity than the Western Church, and was divided into the patriarchates of Constantinople, Alexandria, Antioch, Jerusalem, and, after the separation of East and West, Moscow. See Greek Church.

**Eastern Province.** Name given to several provinces, owing to their geographical position: (1) Province of the Belgian Congo, comprising the districts of Upper Nele, Lower Nele, Ituri, Stanleyville, Aruwimi, Lova, Kivu, and Maniema. Each district is under a commissioner and the prov. is governed by a vice-governor. The capital is Stanleyville. (2) Province of the Uganda Protectorate, comprising the districts of Busoga, Bukedi, Teso, Lango, Karamoja, and Lolor. The prov. is under direct administration, with the exception of the districts of Karamoja and Lolor. Included in the area of this prov. are the lakes of Kioga, Kirkpatrick, and Mpologoma. The highest point is Mt. Elgon, which lies on the S.E. boundary; it has an alt. of 14,152 ft. There is a forest on Mt. Elgon containing valuable timber, the area of this being estimated at 50 sq. m. (3) Province of Ceylon. It has an area of 3,848 sq. m. and a pop. of 183,317. A large lagoon runs parallel to part of its coast-line.



Easter Island. Views of some of the prehistoric remains. 1. Typical head showing long ear and pointing lips. 2. Bird-men carvings on rocks of Orongo. 3. Statues on the slope of Rano Raraku. 4. Hill of Rano Raraku, with prostrate images in the foreground; above are the quarries. 5. Image on Rano Raraku excavated to show the hands

## THE EASTERN QUESTION

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*The origin and nature of this perplexing problem is here described.*

*Related information will be found in such articles as Beaconsfield; Bulgaria; Constantinople; Turkey. See also Europe: History*

The Eastern Question deals with the disintegration of the Ottoman or Turkish Empire in the Balkans and Mediterranean basin. That empire was acquired during the period extending from the fall of Constantinople in 1453 to the death of Solomon the Magnificent in 1566. Despite the follies of degenerate sultans, Turkey survived the 17th century intact, excepting that Austria gained Transylvania, Slavonia, and Croatia, 1698, and Turkish Hungary, 1718.

The treaty of Kutschuk Kainardji, 1774, whereby the Russians forced the Turks to tolerate Christianity in Moldavia and Wallachia (modern Rumania), inaugurates a new phase in the Eastern Question in which the tears project the subjugation of entire European Turkey. They coveted the Mediterranean ports and the Levantine commerce. As heads of the Orthodox Church they would emancipate an Orthodox majority in the Balkans from the domination of a Moslem minority. As monarchs of a Slavonic empire, their nascent Pan-Slavonic sentiment fostered a desire to embrace the Slavs of the Balkans within their political influence. Catherine II clinched the matter by inscribing in 1774, over the entrance to the Crimea, "The way to Constantinople."

The period 1821-78, from the war of Greek Independence to the congress of Berlin, sufficed for the establishment of autonomous Balkan states. The former ended in the establishment of an attenuated Greek kingdom in 1832, while by the Russo-Turkish treaty of Adrianople, 1829, the Danube and Dardanelles were opened freely to navigation; Moslems were banished from Moldavia and Wallachia, whose hospodars ruled for life with sovereign powers independent of the Porte; Serbia became autonomous but tributary, and in 1830 elected its own prince. Mehmet Ali revolted, and in 1840 received the pashalik of Egypt, practically as an hereditary dominion. The quarrel over the Holy Places in 1850 led Czar Nicholas I boldly to propose a partition of the "sick man's" possessions, the Balkan states to have autonomy under Russia, England to compensate herself in Egypt, Cyprus, and Crete. Instead, came the Crimean War.

The peace of Paris, 1856, placed

the Danube under an international commission, and freed Moldavia and Wallachia (now increased by a strip of Bessarabia) from Russian influence. Despite European diplomacy, these two principalities united quietly, 1866, to form the kingdom of Rumania. Christian Turkey was in a condition of latent insurrection, which became active in the revolt of Bosnia and Herzegovina in 1875 and Bulgaria, in which Serbia and Montenegro participated. Turkey's ferocious retaliation produced "the Bulgarian atrocities" and the victorious intervention of Russia. The congress of Berlin, 1878, transferred the Dobruja to Rumania in exchange for Bessarabia, and founded the independent principality of Bulgaria, shorn, however, of Rumelia and without Nish and Mitrovitz, claimed by

Bulgaria but allotted to Serbia. Montenegro obtained the ports of Antivari and Dulcigno. Austria was entrusted by the Powers with the guardianship of Bosnia and Herzegovina and the sanjak of Novi Bazar.

Russia was the driving force that emancipated the Balkans, but from the beginning she found that it was not, as she conceived, a Russian domestic question, but one involving the interests and activities of all Europe. Britain dreaded that a powerfully aggressive Russia predominant in Turkey would destroy her Levantine trade and menace Indian communications, a dread intensified by the opening of the Suez Canal in 1869. Liberal opinion championed the national aspirations of the Balkans; Conservatives regarded Turkey as a buffer against Russia to be preserved at all costs.

Austria after 1866, expelled from Germany, and by the Zollverein cut off from the ports of the Baltic and North Sea, wanted to assimilate the Balkans. Russian influence



Eastern Question. Map of the Balkan States, showing the territorial changes between 1815 and 1920, and, in addition, Turkey's 1923 boundary

there she abhorred as incompatible with her own ambitions.

Ever since the time of Francis I (d. 1547) France had maintained an entente with Turkey, thus checking Austria and helping French power in the Mediterranean. The 19th century saw her aspiring to possess Algeria, Morocco, and Tunis, and especially Egypt, and investing huge sums in Turkish enterprises. Both cash and policy depended upon the preservation of Turkish integrity.

Between 1859 and 1870 Italy expelled the Austrians. Fearing Austrian vengeance, she wished to strengthen her frontier by acquiring the Trentino and the Isonzo. To check Austria in the Balkans, to protect her exposed eastern seaboard, and to enhance her maritime supremacy, she dreamed of regaining the ancient Venetian dominion in Istria and the Dalmatic coast, and establishing herself in the Albanian ports of Durazzo and Valona, her policy challenging Albanian sentiment and Greek ambition.

On every occasion the annihilation of European Turkey was prevented at the last moment by the mutually destructive aims of the Christian powers. They delayed the evolution of the Balkan states, tried to make them helots of European diplomacy, deprived them of legitimate territory, and left them with burning grievances. So the end of the 19th century witnessed a new phase—the Balkan states repudiating European patronage and adopting an aggressive policy. In 1881 Greece received Thessaly and part of Epirus, and Rumania became a kingdom. Milan of Serbia became king in 1882. Rumelia joined Bulgaria, 1885, under Alexander of Battenberg, and subsequently under Ferdinand of Coburg, 1887, although recognition was withheld by the Powers until 1896. The Greco-Turkish war of 1897 obtained autonomy for Crete in 1898.

#### Ferdinand Proclaimed Tsar

Then followed a general attack upon Mediterranean Turkey. France allowed Britain sole sway in Egypt, 1904. Serbia signalled her independent attitude by murdering the Austrophil Alexander Obrenovitch, and enthroning Peter Karageorgevich, 1903. The Balkan states began to draw together, the first sign being the Serbo-Bulgarian customs union (1905-6). Austria stimulated the movement by taking advantage of Russian preoccupation in Manchuria to annex Bosnia and Herzegovina, 1908, although by abandoning the sanjak of Novi Bazar, 1909, she offered the apple of discord to

Serbia, Greece, and Bulgaria. Bulgaria repudiated Turkish suzerainty, and Ferdinand proclaimed himself tsar, 1909.

The moment was favourable. A military convention between Serbia and Montenegro (1908) expanded into the Balkan League, 1912, of Serbia, Bulgaria, Greece, and Montenegro, which drove Turkey behind the Chatalja lines. But woe to the conquerors! The treaty of London, May 30, 1913, proved nothing, except that the historical, ethnological, and geographical claims of the Balkan states were so mutually confounding that it was humanly impossible to satisfy those claims and delimit permanent frontiers. Bulgaria, prompted by Austria, treacherously attacked Greece and Serbia.

Her defeat, the Turkish reoccupation of Adrianople, and the intervention of Rumania forced her into the treaty of Bukarest (Aug. 10, 1913) and a treaty with Turkey (Sept. 29, 1913). At Bulgaria's expense Rumania took a further strip of the Dobruja; Bulgaria expanded westwards by absorbing territory as far as Strumitsa, and southwards the seaboard from Kavalla to Enos, with the port of Dedegatch and the Thracian hinterland; Greece took Epirus, Southern Macedonia almost to Monastir, and within a great curve thence to Kavalla, including Salonica, and lastly all the islands of the Aegean save Imbros, Tenedos, and the Sporades; Serbia had Central Macedonia with such disputed towns as Monastir, Uskub, and Nish, and also the sanjak of Novi Bazar.

#### The Great War and After

The new situation was pregnant with trouble; with the Balkan *entente* dissipated; Bulgaria disgraced, resentful, coveting Central Macedonia and the Thracian harbours, and driven into intrigue with Austria and Turkey; Greece coveting Bulgaria and Turkish Thrace, Albania, and Crete; Serbia without a harbour and severed from the Slavs of Bosnia, Herzegovina, Croatia, and Carniola; Montenegro lamenting Scutari; Italy intent upon Istria; Russia determined to revenge Austrian treachery and regain her Balkan footing; while Germany, with her dream of a German Middle East, a corridor to Constantinople, a Berlin to Bagdad rly., and her economic exploitation of the Near East, encouraged mischief. The Eastern question, together with the Serajevo murders of June 28, 1914, produced the Great War.

The peace of Versailles, 1919, brought no peace to the Near East, nor is the Turk banished from Con-

stantinople and Europe. A French mandate for Syria was opposed by the Arab Emir Feisal, who was deposed from his kingdom of Damascus. Greece, firmly established in Crete, and mandatory for the western coast of Asia Minor, including Smyrna, 1919, was in 1920 fighting irreconcilable Turks under Mustapha Kemal. Granted Bulgarian Thrace from Kavalla to Enos, 1919, the Greeks claimed Turkish Thrace, 1920, and occupied Adrianople (July 25, 1920). Serbia, with Bosnia, Herzegovina, Croatia, and Carniola, formed a "Serb-Croat-Slovene state," 1919, and with Montenegro, a Yugo-Slav Confederation, 1920. Bulgaria, excluded from the Mediterranean, has a valueless coast-line on the Black Sea, and has lost large populations to Greece and Serbia. Austria and Russia are defunct as Balkan powers, Constantinople is the centre of an international zone including the Bosphorus, the Sea of Marmora, and the Dardanelles. Rumania, besides the Bukovina and a huge slice of Hungarian Transylvania, occupies Russian Bessarabia.

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**East Ham.** Mun. bor. of Essex, England. It is a populous district, with stations on the London, Tilbury, and Southend and G.E. Rlys., 6 m. E. of London. The residents are mainly of the industrial class, and work at the docks or in the many factories and workshops of the borough; the industries include engineering works and the making of chemicals, soap, etc. There is an old church, the parish church of S. Mary Magdalene. The borough, which is outside the county of London, is governed by a mayor and corporation, having been made a municipality in 1904. It sends two members to Parliament. Pop. 156,500.

**East India Company.** Name of a trading corporation, authorised by government to trade in the E. Indies. The Dutch company, 1602-1798, the French company, 1664-1794, and the Danish company, 1729-1801, followed the setting up of the English company, which survived them all. On Dec. 31, 1600, a charter was granted by Queen Elizabeth to "The company of Merchants of London trading to the East Indies." The establishment of three factories or trading-stations was sanctioned: at Surat, on the W. Coast, by the Mogul Jehan Gir in 1612; at Fort St. George, afterwards Madras, on the

S.E. coast, by another native prince in 1639; at Hooghli, on the Ganges delta, 50 years later moved a little lower down the river to Calcutta, by Shah Jehan in 1640.

In 1661 the Portuguese gave Bombay to Charles II as part of the dower of his bride; he conveyed it to the company, and it took the place of Surat as the western emporium. The three factories at Bombay, Madras, and Calcutta became the nuclei of the three presidencies.

The company was exclusively a trading concern. It had much difficulty in suppressing the embarrassing rivalry of independent traders called "Interlopers," who ignored its exclusive charter. In the reign of William III a rival company was actually sanctioned and started, but in 1701 the two were amalgamated as the Honourable East India Company. In 1746 Duplex, the governor of the rival French company, attempted to oust the British and establish a French political ascendancy with the native princes. He was frustrated by Clive, with the general result that in 1765 the trading company had become the official administrators of the great province of Bengal, while sundry of the great princes were virtually their dependents.

The home government now became alive to a responsibility for the dominions acquired by the company; the unsuccessful experiment of Lord North's Regulating Act was followed by Pitt's India Act in 1784, which instituted the dual control shared between the company itself and a board of control appointed by a committee responsible to Parliament. After the Mutiny of 1857 the government of India was transferred to the crown, and the East India Company was abolished by the India Act of 1858. See India.

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**East Indiaman.** Name applied to the large sailing vessels employed in the East Indies trade. They were often armed for self-defence.

**East India United Service Club.** London club founded in 1849 for those connected with the services, military and civil, in India. Its premises are at 16, St. James's Square, London, S.W.

**East Indies.** Popular name loosely applied to India, Indo-China, the Malay Peninsula, the islands of the Malay Archipelago, Sumatra, Java, Borneo, New Guinea, the Philippines, etc. All are described under their respective headings.

The Dutch East Indies are possessions belonging to Holland. They lie between 6° N. and 11° S. latitude, and between 95° and 141° E. longitude. They include the islands of Sumatra, Java, Madura, Celebes, Billiton, Banca, Bali, Lombok, the Sunda Islands, the Molucca Islands, part of Timor archipelago, Riau-Lingga archipelago, and large portions of Borneo and New Guinea. The land area is approximately 735,000 sq. m., and the pop. 48,000,000, with 81,000 Europeans. From 1602-1798 these possessions were governed by the Dutch East India Company, but are now administered by a governor-general, assisted by a council of five.

**East Kent Regiment, THE.** Regiment of the British army. Formerly the 3rd Foot, this regiment



East Kent Regiment badge

had its origin in the train-bands of the city of London. Elizabeth sent a force of them to help the Dutch, which was known as the Holland regiment. It was after its return to England that the regiment first received the designation of the Buffs, from the colour of its facings. It became a regiment of the British army in 1665. The East Kents fought in Flanders in 1692, and took part in Marlborough's campaigns, and in some of the battles of the Peninsular War. Later the regiment was engaged in the Crimea, and in China, 1860.

The regiment had a splendid record in the Great War. Of its two regular battalions, the 1st reached France in Sept., 1914, joining Pulteney's third corps. The 2nd, from India, joined the army in the field the following winter. A reserve (militia) battalion reached France in 1914. There were in all ten battalions, eight of which saw continuous active service. The regimental depot is at Canterbury.

**Eastlake, SIR CHARLES LOCK** (1793-1865). British painter and writer on art. Born in Plymouth, Nov. 17, 1793, he was taught drawing by Sam Prout and history painting by Benjamin Haydon, later attending the schools of the Royal Academy. In 1827 he was elected A.R.A. and in 1829 R.A., and in 1842 librarian to the Academy.

He was keeper of the National Gallery from 1843-47, and in 1850 was chosen president of the Academy, and knighted. He was appointed the first director of the National Gallery in 1855. The Escape of Francesco Carrara, 1834; Christ Weeping over Jerusalem (his masterpiece), 1841; and Sisters, 1842, are in the Tate Gallery, London. His Materials for the History of Oil Painting, 1847, once enjoyed considerable vogue. He died at Pisa, Dec. 24, 1865. See Memoir by Lady Eastlake, 1870; Pictures by Sir C. Eastlake, with biographical and critical sketch, W. C. Monkhouse, 1875.



*C. L. Eastlake*  
After Bridgeford



East Indies. Map of the East Indian islands, the land bridges between Asia and Australia

**East Lancashire Regiment.** Formerly the 30th and 59th Foot and one of several regiments raised



**East Lancashire Regiment badge**

in 1702 for service as marines on board ship. They took part in the capture of Gibraltar in 1704 and in the subsequent naval action off Malaga. In 1727 -28 they helped to defend Gibraltar, and in 1806 were in Sir David Baird's force which seized the Cape of Good Hope. In the Peninsular War the East Lancashires fought at Corunna, Badajoz, Salamanca, and Vittoria; they were at Waterloo and took part in the Mahratta War (1817-19). In 1825 the regiment distinguished itself at the capture of Bhurtapore, as it did later at Inkerman; it shared in the storming of Canton (1857), the second Afghan War, and the Chitral expedition. It did excellent service in the South African War.

During the Great War the 1st battalion beat back a strong German attack in the first battle of Ypres, 1914, and the 2nd participated in the British attack on the Aubers Ridge, 1915. The 11th distinguished itself at the battle of the Somme, 1916, and men of the East Lancashires took part in the third battle of Ypres, 1917. Two battalions formed part of the East Lancashire Territorials mobilised in Aug., 1914, as the 42nd division. The latter fought in Gallipoli and in the early stages of the Sinai desert campaign, and proceeded to France in March, 1917. The regimental depot is at Preston.

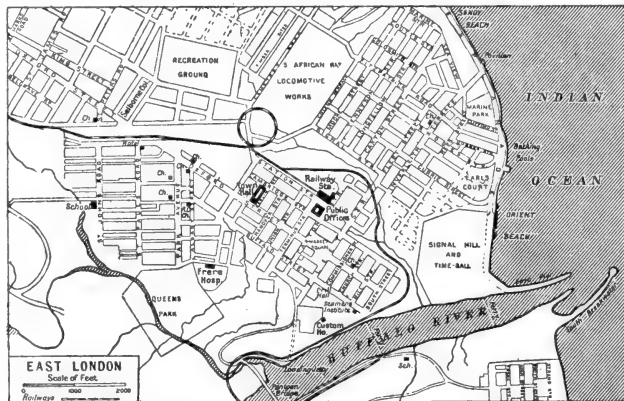
**Eastleigh.** Urb. dist. (Eastleigh and Bishopstoke) of Hampshire, England. It is 5½ m. N.E. of Southampton on the L. & S.W.R., which has works here for the manufacture of rolling stock. A great aerodrome situated between Eastleigh and Swaythling on the main L. & S.W.R. was begun some time before the armistice, Nov., 1918, but was never used by the R.A.F. It was taken over by the American naval air service, but it was never put to any real use as a flying station. The civil aviation department controlled it for a time, but it was later allowed to remain derelict. Pop. 15,247.

**East Liverpool.** City of Ohio, U.S.A., in Columbiana co. It stands on the Ohio river, 44 m. W.N.W. of Pittsburg by the Pennsylvania Rly. The staple industry is porcelain manufacture, the city being the chief pottery centre of the country. Yellow ware was first

made here in 1839, white ware being introduced in 1872. Bricks, steel, and machinery are also manufactured. Settled in 1796, East Liverpool was incorporated in 1834. Pop. 22,940.

**East London.** City and seaport of Cape Province, S. Africa. It stands at the mouth of the Buffalo river, mainly on the E. side, 887 m. by rly. from Cape Town. It has a spacious harbour, and by dredging

**East Lynne.** Novel by Mrs. Henry Wood (q.v.), published in 1861. It achieved an enormous contemporary success, was translated into all European and some Oriental languages, and is still very widely read, while several dramatic versions have enjoyed almost equal popularity. The chief interest of the book—an interest which is intensified in the plays founded upon it—lies in the situation which



**East London.** Plan of the S. African seaport and watering-place, at the mouth of the Buffalo river

operations the great obstacle to its development, the bar at the river mouth, has been in large part overcome. There are ample wharves and other shipping accommodation. The city is a rly. terminus.

Apart from the shipping the chief industries are connected with the trade of a large district. It has also some fishing. The chief buildings are the city hall and the public offices. The city is lit by electricity and has a service of electric tramways. It is also a watering-place, with good facilities for sea-bathing, and there is ample accommodation for visitors, including a space prepared for tents. Pop. 20,867.

develops when the erring Lady Isabel returns to her home and children disguised as a nurse. East Lynne has little literary merit, but the plot is well constructed and the reader's interest continuously sustained.

**Eastman, GEORGE** (b. 1854). American inventor. He was born at Waterville, N.Y., July 12, 1854, and educated at Rochester, N.Y. He experimented in the making of dry plates, and in 1880 began to manufacture them; four years later he produced the first efficient roll-film, and in 1888 perfected his first Kodak camera. Two years later he patented the first machine



**East London, South Africa.** View of the town and the Buffalo river



for making rolls of transparent film. As head of the various Kodak companies he amassed great wealth. He endowed the Rochester Mechanics' Institute and the laboratories of the university of Rochester, and in 1912 gave £100,000 towards the endowment of that university.

**Easton.** City of Pennsylvania, U.S.A., the co. seat of Northampton co. It stands at the union of the Lehigh and Delaware rivers, 76 m. W.S.W. of New York on the Pennsylvania and other rlys. Near the coalfield, it is a busy rly. and industrial centre, with manufactures of silk, textiles, woollens, pumps, drills, stoves, and organs. The seat of Lafayette College, founded 1832, it has a number of schools and a public library. Several treaties with the Indians were concluded here between 1756 and 1761. Founded 1750, it was incorporated in 1789, and became a city in 1887. Pop. 32,000.

**Easton's Syrup.** Syrup of iron phosphate with quinine and strychnine. Each fluid dram contains  $\frac{1}{3}$  of a grain of strychnine. It is used as a tonic in cases of anaemia and general debility in doses of  $\frac{1}{2}$  to 1 fluid dram. It is also prepared in the form of sugar-coated tablets.

**East River.** Channel communicating between Long and Manhattan Islands, U.S.A. On the N. it is connected by the Harlem river with the Hudson river. Its length is 15 m. and its breadth varies from  $\frac{1}{2}$  m. to between 3 m. and 4 m. Four great suspension bridges and numerous ferries connect New York proper with its Long Island suburbs. See illus. facing p. 1374.

**East Surrey Regiment.** Raised in 1702, this regiment served until 1713 as marines at Gibraltar and elsewhere. It then became the 31st Foot, and fought at Dettingen, where George II gave the men their nickname of the "Young Buffs." In



East Surrey Regiment badge

1756 a second battalion was raised; this was numbered the 70th, and the two were united as the East Surreys in 1881. The regiment fought in America in 1776-77 and in the W. Indies in 1793-96. It rendered excellent service in the Peninsular War, especially at Talavera and Albuera. In 1842 it marched to Kabul and spent nearly two years fighting in Afghanistan; in 1845-46 it served against the Sikhs, and later in the Crimean War, the China War

(1860), the New Zealand War (1863), and the Egyptian War (1884-85). Under Buller in the S. African War the regiment fought hard to relieve Ladysmith.

In the Great War the 1st battalion fought with the 5th division in 1914, and distinguished itself at Mons, Le Cateau, at the battle of the Marne, and at La Bassée. It also did fine service at Hill 60. The East Surreys were notable for the charge they made on the opening day of the battle of the Somme, July 1, 1916. The 9th battalion lost heavily in the preliminary assault on Guillemont, Aug. 16, 1916, and parties of the 13th distinguished themselves at the first battle of Cambrai, Nov., 1917. Men of the East Surreys were heavily engaged in the third battle of Ypres, 1917, and participated in most of the battles of 1918. The regimental depot is at Kingston-on-Thames.

**Eastward Position.** Term applied to several observances of the Christian Church, especially to the position taken up by the officiating priest at the celebration of the Holy Eucharist and the practice of turning to the E. at the recitation of the creeds. The position of the priest has been the subject of much controversy in the Anglican Church, consequent on the conflict between the rubric of 1552 and the replacing of the altar in 1660.

In the primitive Church converts at baptism turned to the W. when renouncing the devil and to the E. when confessing their faith in Christ. Thus Augustine says, "When we rise for prayer we turn towards the East." Chancels of churches are usually in the E., so that worshippers, when turning towards the altar, face the E. Similarly arose the custom of burying Christians with the feet towards the E. and the face upward, so that at the Resurrection they might be ready to meet Christ and be in a posture of prayer as soon as raised. Pagans commonly worshipped with their faces towards the rising sun, and the Christian adoption of the custom gave rise to the charge that they were sun-worshippers (Tertullian). The Jews in exile turned towards Jerusalem when they prayed (Dan. 6) and Mahomedans face Mecca. See Oxford Movement.

**Eastwood.** Urban dist. of Nottinghamshire, England. It is 9 m. N.W. of Nottingham by the G.N.R. Collieries provide the chief employment. Here took place the meeting of colliery owners which marked the first step in rly. construction from which the M.R. was developed. Market days, Fri. and Sat. Pop. 4,692.

**Eastwood.** Parish of Renfrewshire, Scotland. It contains the towns of Pollokshaws and Thornliebank, and part of Shawlands, forming an outlying suburb of Glasgow. Pop. 24,515.

**East Yorkshire Regiment.** Formerly the 15th Foot, this regiment was raised in 1685 at the time of Monmouth's rebellion. After serving in Flanders (1694-97), it was engaged in Marlborough's campaigns, and was one of the regiments that led the attack at



East Yorkshire Regiment badge

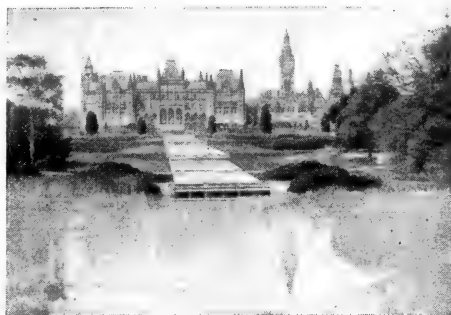
Blenheim. In 1758-59 it served under Wolfe in the captures of Louisbourg and Quebec. The East Yorkshires did good work in seizing the West Indian Islands from the French both before and after they served against the American Colonists. They fought in the Afghan War of 1879-80, and one battalion was in the 8th Division during the South African War.

In the Great War the first battalion won distinction in the battle of the Aisne, 1914. The East Yorkshires were very hard hit by the German gas attack at Frezenberg, May, 1915; the 12th and 13th battalions showed remarkable skill and courage on the Ancre, Nov., 1916. Men of this regiment fought at the third battle of Ypres, 1917, and in the subsequent campaigns on the western front. The regimental depot is at Beverley.

**Eating House.** Obsolete term for what is now generally known as a restaurant. It has passed, with cook-house, coffee-house, and dining-house, out of ordinary usage, and is now only used colloquially, or applied to the humbler places of refreshment. See Coffee House.

**Eaton, SIR JOHN CRAIG** (1876-1922). Canadian merchant. He was born at Toronto, April 28, 1876, and was educated at Toronto public schools and Upper Canada College. He became president of the great trading firm of Timothy Eaton Co., of Toronto and Winnipeg, founded by his father. Knighted in 1915, he died March 30, 1922.

**Eaton Hall.** Seat of the duke of Westminster, Cheshire, England. It stands on the river Dee,  $\frac{1}{4}$  m. S. of Chester. A magnificent Gothic structure, built 1867-80, the fourth on the same site, it stands in a well-timbered demesne of 400 acres. The interior is richly decorated, and besides examples of Rubens, West, and Millais, the pictures include a fine collection of portraits of famous



Eaton Hall. View from the gardens of the Cheshire seat of the Duke of Westminster

racehorses owned at various times by members of the family. The western portion of the Eaton estate was sold for £330,000 in 1919.

**Eaton Square.** Largest square in Belgravia (*q.v.*), London, S.W. Covering about 5 acres, it has six gardens, is named from the duke of Westminster's Cheshire seat, Eaton Hall (*q.v.*), and was built 1827-53. At the E. end is the church of S. Peter, 1824-26, restored 1872, where many fashionable marriages have taken place. No. 71 was, for a time, the official residence of the Speaker of the House of Commons.

**Eau Claire.** City of Wisconsin, U.S.A., the co. seat of Eau Claire co. At the confluence of the Eau Claire and Chippewa rivers, 88 m. E. of St. Paul, it is served by the Chicago, Milwaukee and St. Paul, and other rlys. Its buildings include a Carnegie library, the county court, schools, and a sanatorium, and it has several parks. A busy lumber centre, it contains foundries, iron and steel works, paper mills, and canneries. Settled in 1846, it was granted a city charter in 1872. Pop. 18,875.

**Eaucourt L'Abbaye.** Village of France, in the dept. of Somme. It lies slightly S. of the Albert-Bapaume road, about 1 m. S. of Le Sars. Captured by the British Oct. 1, 1916, it was retaken by the Germans in March, 1918, and recovered by the Allies in Aug., 1918. See Somme, Battles of the.

**Eau-de-Cologne.** Perfume said to have been invented by an Italian chemist, Johann Maria Farina, who settled in Cologne in 1709. It is believed that the original recipe has never been discovered, though many chemists in Cologne, using the name of Farina, claim to be the sole owners of it. The perfume is prepared from alcoholic vegetable extracts, essential oils, and rectified spirits. The usual recipe prescribes twelve drops of each of the essential oils, bergamot, citron,

neroli, orange, and rosemary, with one dram of Malabar cardamoms and a gallon of rectified spirits, which are distilled together. Eau-de-Cologne is largely made in Great Britain, where the oils are mixed with a highly purified spirit, and distillation is unnecessary.

**Eau-de-Javel.** Bleaching liquid first made in 1789

at the Javel Chemical Works, Paris. It was the first practical means of utilising the bleaching properties of chlorine. Eau-de-Javel, prepared by passing chlorine gas into a solution of potash, was also employed as a disinfectant. Shortly afterwards Charles Tennant, of Glasgow, prepared bleaching powder by passing chlorine gas over quicklime, and Labarraque, a French chemist, made a better bleaching liquid, eau-de-Labarraque, which is a solution of sodium hypochlorite made from sodium carbonate and calcium hypochlorite.

**Eau-de-vie** (water of life). Old French name for brandy. The product of a distilled wine was so called in the 13th and 14th centuries, and the name is still used. The eaux-de-vie de marc are distilled from wine lees or from the residue in the stills after the best brandy has been made. See Brandy; Fire-Water.

**Eaux-Bonnes.** Watering-place of France. In the dept. of Basses-Pyrénées, it is 28 m. S. of Pau. It stands 2,460 ft. high, just where two streams, coming down from the Pyrenees—the Sourde and the Valentin—meet, and is named on account of its waters. These have been known since the 14th century, and are good for lung and other bodily troubles. Winter sports are held and the place has several hotels. Pop. 622.

**Eaux-Chaudes.** Watering-place of France. In the dept. of Basses-Pyrénées, it is 5 m. from Eaux-Bonnes, standing where a stream, the Gave d'Ossau, comes down from the Pyrenees, its valley being one of the most beautiful in the neighbourhood. The town has hot springs—hence its name—which, being sulphurous, are good for rheumatism, affections of the respiratory organs, etc.

**Ebbfleet.** Coast hamlet of Kent, England. It stands on Pegwell Bay,  $3\frac{1}{2}$  m. S.W. of Ramsgate, and is the traditional landing point

of Hengist and Horsa in 449-450, and also the place at which S. Augustine and his forty monks disembarked in 597.

**Ebbw Vale.** Urban dist. of Monmouthshire, England. It stands on the Ebbw-fawr, a headstream of the Ebbw river, 21 m. N.W. of Newport, on the G.W., L. & N.W., and Rhymney Rlys. In a busy colliery district, it has large iron-works, iron and steel being here manufactured on a large scale and the coal exported. Christ Church, a modern building in the Early English style, is the chief building. Market day, Sat. Pop. 30,541. Pron. Ebbow.

**Eben,** MAX VON. German soldier. He commanded the 2nd Baden dragoon regiment previous to the Great War. In Sept., 1914, he was appointed to command the 10th reserve army corps, and in 1916 had command of the Bavarian regiment on the Russian front. He had charge of an army in the German thrust for Paris, July, 15, 1918. See Marne, Second Battle of the.

**Ebenaceae.** Natural order of trees and shrubs: the ebony family. They have alternate, undivided leaves, and regular flowers, succeeded by berries. They are chiefly natives of tropical countries. The timber is hard and dark-coloured. See Ebony.

**Ebenezer** (Hebr., stone of help). Name of an unidentified spot where the Hebrews were defeated by the Philistines (1 Sam. 7); also that of a stone set up by Samuel near Mizpah in memory of an Israelitish victory over the Philistines (1 Sam. 4). It is used as a Christian name.

**Eberhard** (1445-96). Duke of Württemberg. Born Dec. 11, 1445, a member of the ruling family of Württemberg, he became count of one part of it in 1457. In 1482 he secured the rest of the country, and in 1495 was raised to the rank of a duke. By uniting Württemberg and by obtaining support for certain changes, both from the emperor without and from his own nobles within, he is regarded as the founder of the country. One who shared in the intellectual awakening of his time, he founded the university of Tübingen and encouraged scholars. His wife, Barbara, one of the Gonzaga family, shared his tastes. Eberhard, who was known as the Bearded (im Bart), died Feb. 25, 1496, at Tübingen, where he is buried.

**Ebers,** GEORG MORITZ (1837-98). German Egyptologist and novelist. Born March 1, 1837, at Berlin, he studied at Göttingen and Berlin, and early specialised in Egyptology. To popularise his

favourite study through the medium of fiction, he wrote *An Egyptian Princess*, 1864, Eng. trans. 1870-71. In 1865 he became lecturer and later professor in Egyptology at Jena.

After his first travels in Egypt, Ebers wrote *Egypt and the Book of Moses*, 1868.

He was appointed professor of Egyptology at Leipzig, 1870, a post which he resigned in 1889. He revisited Egypt in 1872-73, and discovered at Thebes one of the finest examples of ancient papyri—Papyrus Ebers, now in the Leipzig Museum. This is a medical treatise from Sais of the 16th century B.C., and includes a long chapter on the eye, an extraordinary coincidence, since nearly ten years before Ebers had written in *An Egyptian Princess* of such a MS. and its fortunes. In addition to many novels based on Egyptian history, he wrote historical novels descriptive of South Germany and the Netherlands in the 16th century. He died at Tutzing, Aug. 7, 1898. See *Autobiography*, Eng. trans. F. J. Safford, 1893.

**Eberswalde.** Town of Prussia. It is 28 m. N.E. of Berlin, with which it is connected by rly. and also by canal. The chief buildings are churches and schools, one of the former being a 14th century building, while the latter include a school of forestry. It has several industries, including the making of paper, bricks, nails, and brass founding. Pop. 26,100.

**Ebert, Friedrich** (1870-1925). German statesman. Born at Heidelberg, and educated at an

elementary school, he was apprenticed to a saddler of that town. In 1892 he became editor of the socialist organ, *Bremer Bürgerzeitung*, and in 1894 married Louise Kamp, who, he said,



Friedrich Ebert,  
German statesman

proved his best counsellor throughout his career. In the Revolution of 1918 he succeeded Prince Max of Baden as chancellor on Nov. 9, and then became provisional president of Germany. He maintained his position through the stormy days of Jan., 1919, and at the opening of the new National Assembly at

Weimar, Feb. 6, 1919, he made a long protest against the armistice terms, and urged the union of German-Austria with Germany. On Feb. 11 Ebert was elected first socialist president of the German republic. He died Feb. 28, 1925. See *Germany*.

**Ebionites** (Hebr. *ebyōn*, poor). Name given to certain Judaizing sects in the Christian Church in the second century. Denying the divinity of Christ, they regarded Christianity as merely a reformed type of the Jewish religion, and Christ as only a natural man of exceptional spiritual attainments acquired by a strict observance of the law of Moses. References in the writings of Irenaeus and other Fathers state that the Ebionites observed all the details of the Mosaic Law, recognized only the Gospel of S. Matthew, and rejected S. Paul as an apostate. At a later period the Ebionites largely held the Gnostic heresy of the dualistic origin of the universe.

**Eblis** or **IBLIS**. A Mahomedan name for Satan or the prince of darkness. In the Koran it is stated that God, having made Adam, called upon the angels to bow down and worship him; all did so except Eblis, who refused, and became the declared enemy of the newly created race of men. Eblis is also described as chief of the genii.

**Ebner-Eschenbach**, BARONESS MARIE VON (1830-1916). Austrian dramatist, novelist, and poet. She was born Sept. 13, 1830, in Moravia, the daughter of Count Dubsky, and married an Austrian officer, Moritz von Ebner-Eschenbach, who afterwards became field-marshal. She published several plays, including *Maria Stuart* in Schottland (1860), and then turned to fiction. Her first tale, *Die Prinzessin von Banalien*, appeared in 1872; and *Zwei Komtessen* (1885) became widely popular. *Parabeln, Märchen und Gedichte* appeared in 1892. The author takes a leading place among modern German women writers.

**Eboli** (anc. *Eburum*). Town of Italy, in the prov. of Salerno. It occupies an elevated position, alt. 470 ft., overlooking the Sele river, 16 m. by rly. S.E. of Salerno. It contains an old château of the prince of Angri, a church with 14th century paintings, and a few remains of *Eburum*, the old Lucanian city. Pop. 12,741.

**Ebonite** or **VULCANITE**. Hard vulcanized rubber made by mixing pure rubber with about one-third of its weight of sulphur, and heating for a number of hours in temperature rising to 300° F. Ebonite is largely used as a sub-

stitute for bone, ivory, and horn, for making small ornamental articles, as combs, knife handles, buttons, etc. It can be moulded, cut, carved, and polished to a high degree of perfection. See *Rubber*.

**Ebony** (*Diospyros*). Trees of the natural order Ebenaceae, whose heart-wood is the ebony of commerce. Several species furnish the timber, the difference being denoted by the place of origin. Mauritius ebony is the produce of *D. ebenum*; Coromandel ebony



Ebony. Fruit and leaf of Persimmon (*Diospyros Virginiana*), one of the *Ebonies*

of *D. melanoxylon*; and the bastard ebony of Ceylon is obtained from *D. ebenaster*. Calamander-wood, a variegated ebony, is the timber of *D. hirsuta* from India and Ceylon. Some of the species have edible fruits. See *Date-plum*; *Persimmon*.

**Ebor.** Abbreviation of *Eboracum*, the Latin name for York. It is still used as a signature by the archbishop of York, e.g. Cosmo Ebor. See *York*.

**Ebro** (anc. *Ibērus*). River of N.E. Spain. Rising in the Cantabrian Mts., in the prov. of Santander, it flows S.E. to the Mediterranean. Its length is about 460 m., and it drains some 35,000 sq. m. Its chief affluents are the Jalon, Huerva, Guadalope, Aragon, Gallego, and Segre. Running through narrow valleys, its channel is obstructed by shoals and rapids. Ships can proceed only as far as Tortosa (16 m.).

**Eburacum** or **EBORACUM**. Roman town on the site of which the city of York, England, now stands. Erected by the Ninth legion on an earlier Caer Eborac about A.D. 75, the fort of 52 acres—still traceable in the lower courses of the multi-angular tower—was garrisoned by

the Sixth legion. A municipal colonia flourished on the opposite bank of the Ouse. Here in 120 Hadrian held court, here also died Severus in 211. and Constantius Chlorus in 306. *Pron.* Eburacum. See York.

**E.C.** Abbrev. for East Central postal district, London.

**Eça de Queiroz, José Maria** (1845–1900). Portuguese author. Born at Póvoa do Varzim, N. of Oporto, and educated at Coimbra



**J. M. Eça de Queiroz,**  
Portuguese author

university, he began life as a journalist, and in 1871 was on the staff of the critical journal *As Farpas*. Three years later he published a novel which attracted a good deal of attention, *O Crime do Padre Amaro*. While continuing his work as author he was Portuguese consul successively at Havana, Newcastle, Bristol, and Paris. His later stories included *O Primo Bazilio*, 1877 (Eng. trans. *Dragon's Teeth*, 1889) and *A Reliquia*, 1886. The posthumous collection of *Contos*, 1902, contained the famous stories, *O Defunto* and *O suave milagre*, respectively translated into English as *Our Lady of the Pillar* and *The Sweet Miracle*.

**Écarté** (Fr., discarded). A card game for two players which had a great vogue in France at the beginning of the 19th century. The six down to the two inclusive of each suit having been removed from the pack, the players cut for deal, and the pack is shuffled by the dealer, and cut by his opponent. The dealer then gives five cards to the other player and to himself: either three and two or two and three alternately. The eleventh card is turned up for trumps, the remainder of the pack forming the stock. Should the eleventh card be a king the dealer scores one point; otherwise the turn-up has no scoring value.

The players then look at their hands, and should the non-dealer (the leader) be satisfied with his cards, he may at once proceed to play them. But if he considers it would be advantageous to change any or all of them, he says, "I propose" or "Cards." The dealer then has the option of changing his cards also, and on deciding to do so says, "I accept" or "How many?" Should he be satisfied with his cards, he may refuse, and exclaim "I refuse" or "Play." If either player refuse to change

cards, then both must play their original hands. Otherwise the discarding of cards for others in the stock may proceed so long as both are agreeable. The players being satisfied with their hands; the play begins. If either holds the king of trumps he must declare it before playing his first card, and is entitled to mark one point.

The object of the game is to make tricks; the highest card of a suit wins, though a trump naturally scores over that of another suit. A player must always take a trick if able to do so. The cards rank in this order: King, queen, knave ace, ten down to seven. The winner of a trick always leads to the next. The score is made as follows: Turning up or holding the king of trumps counts 1; winning three tricks out of five is called the *point* and also counts 1; winning all five tricks is termed the *vole* and counts 2. If either player fail to make three tricks after having declined cards, his adversary scores 2. A game consists of 5 points. See *The Standard Hoyle*, 1887; *Foster's Complete Hoyle*, 1897.

**Ecbatana.** Capital of Media. The Hebrew form Achmetha (Ezra 6) survives in the modern Hamadan. Situate 5,930 ft. above sea-level, near Mt. Elwend, it was the summer residence of the old Persian and Parthian kings. Its identification with the seven-storeyed fortress described by Herodotus as built by Deioces (700 B.C.) is in doubt. The so-called Syrian Ecbatana was at Hamath.

**Ecca Shales.** Strata found in the S. of Cape Colony. They often show sun-cracks and ripple-marks, formed soon after they were laid down, in Permian times. Minor beds of sandstone occur, and fossil plants belonging to the *Glossopteris* Flora are found in the series.

**Ecce Homo** (Lat., Behold the Man). Short title of a survey of the life and work of Jesus Christ by Sir J. R. Seeley. It was published anonymously in 1866, and caused a storm of criticism. It attempted to present Christ as an exclusively human personality, the founder of a new system of society.

**Eccentric** (Gr. *ekkentros*, out of the centre). In engineering a metal disk mounted eccentrically on a shaft, to give reciprocating movement to a valve or pump or lever. The edge of the eccentric is grooved and encircled by an eccentric strap, one half of which is secured rigidly to the front end of a connecting rod. In effect an eccentric is a cam: or it may be regarded as a crank having a pin larger than the shaft. See *Steam Engine*.

**Echymosis** (Gr. *ek*, out of; *chymos*, juice). Outpouring of the blood into the tissues beneath the skin. See Bruise.

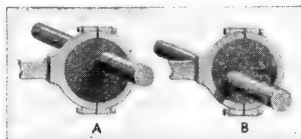
**Ecclefechan.** Village of Dumfriesshire, Scotland. It is 6 m. S.E. of Lockerbie by the C.R., and has been identified as the original of Entepfuhl in Sartor Resartus. It was the birthplace and burial place of Carlyle (*q.v.*). Near by are the Roman camps of Birrens and Birrenswark. Pop. 670. See illus. p. 1709.

**Eccles.** Mun. bor. of Lancashire, England. It stands on the Irwell, 4 m. W. of Manchester, of which it is an industrial suburb, and is served by the L. & N.W.R. Locally famous for its Eccles cakes, the town is actively engaged in the cotton and other textile industries. Pop. 41,944. See Manchester.

**Ecclesfield.** Parish of W.R. Yorkshire, England. It is 5 m. N. of Sheffield, on the Mid. and G.C. Rys. The church of S. Mary, a Perpendicular edifice formerly designated the Minster of the Moors, contains some fine oak carving. There are large cutlery and tool works, paper mills, iron works, and collieries. Pop. 22,404.

**Ecclesia** (Gr. *ekkalein*, to call forth). In ancient Athens, the assembly of the whole body of free citizens. The meetings were held in the Pnyx and latterly in the theatre; on special occasions they were held in the agora. In theory the ecclesia was the supreme power in the state, and any citizen had the right to speak; but in practice its power was virtually confined to the business which had been prepared for it by the *boule*, or council of 500. Voting was by show of hands, and on special occasions by ballot. In addition to some 40 regular meetings a year, the ecclesia could also be convoked for special business by a chief magistrate. The Greek name ecclesia (Fr. *église*) came to be applied in Christian times both to the assembly of Christians and to the place of assembly. See Cathedral; Church.

**Ecclesiastes.** Title adopted, through the Vulgate, from the Septuagint, for the O.T. book which in Hebrew bears the title *Kôheleth*. The meaning of the Hebrew term is disputed, but may be "one who



**Eccentric.** Metal disk on a shaft fixed out of centre. A and B show two positions of this moving shaft

speaks in an assembly" (hence Jerome's rendering *concionator* and the English translation "the Preacher"). In i, 1, 12 the writer seems to be identified with King Solomon, to whom tradition ascribed the authorship. But the language of the book, which contains Persian and possibly Greek words, and represents a transitional stage in the development of Mishnic Hebrew, is that of an age much later than Solomon's. The book cannot, however, be later than Ecclesiasticus (c. 200 B.C.), which presupposes its existence. It presents a strange mingling of despair and pessimism ("Vanity of vanities, all is vanity") with an irresistible sense of the goodness of God. Thus the writer's utterances often seem contradictory.

The true explanation seems to be that the book is a series of reflections representing two or more moods, or in other words is the record of the negative and positive phases in a soul's struggle for light. Hence, probably under Greek influence, a philosophic materialism and epicureanism; under the influence of national subjection, a general despondency; and yet, under the influence of an innate religious trend, an unquenchable faith in a divine dispensation. The materialistic element will account for the hesitation with which the book was admitted into the Hebrew Canon. The writer in one mood sees little profit or progress in life; the same happenings recur perpetually (cf. Nietzsche's philosophy). The best course in life seems to be to eat and drink and enjoy things as much as possible. But in another and wiser mood it is realized that true happiness is dependent upon fear of God and obedience to His commandments (xii, 13). See Proverbs, Ecclesiastes and Song of Songs, ed. G. Currie Martin, 1908 (in the Century Bible).

**Ecclesiastical Commission.** Body constituted in 1836 to manage the extensive estates of the Church of England. Under its direction the large incomes of certain bishops and other dignitaries were gradually reduced to a more uniform scale, and the surplus was devoted to the endowment of poor parishes.

The commissioners are the two archbishops, the English diocesan bishops, 5 cabinet ministers, 4 judges, and 12 others, but in reality the work is directed by the three principal commissioners, one of whom is usually a member of the House of Commons. In certain cases, in 1836, the dean and chapter refused to hand over the cathedral estates to the commis-

sioners, and several such incomes were reduced owing to agricultural depression. Those which took the other course receive a fixed income whatever the rent-roll of the surrendered estates may be. The Commission deals with an annual income of nearly £2,000,000, and after paying the various stipends it usually sets aside some £400,000 a year for increasing the endowment of poor livings and providing something for new ones. The offices are in Millbank, Westminster, S.W. See The Ecclesiastical Commission: sketch of its history and work, L. T. Dibdin and S. E. Downing, 1919.

**Ecclesiastical Courts.** Courts of law that deal with offences against ecclesiastical law, i.e. cases affecting benefices and the like. Such are in their nature confined to an established church, or to one that, although no longer a state church, was so formerly, and retains part of its old organization. The courts held by the pope and by the various prelates of the Roman Catholic Church are ecclesiastical courts. (See Curia.)

In England clerics are now for practical purposes on the same footing before the law as laymen. Formerly this was not so, and the church courts dealt with all kinds of offences committed by clergymen as well as with all cases affecting marriage (divorce, etc.), and wills—two subjects which the church regarded as peculiarly its own. The process of reducing the powers of the ecclesiastical courts

was a gradual one, but by about 1860, the date of the Ecclesiastical Courts Jurisdiction Act, they may be said to have been confined to their present duties, dealing only with cases affecting church discipline, and no longer with any that are offences against the state. In 1855 their jurisdiction in cases of defamation was taken away, and in 1857 they lost that affecting wills and matrimony.

The existing ecclesiastical courts in England are the court of arches, presided over by the dean of arches, which is the chief court in the province of Canterbury; and the chancery court, which fulfils the same purpose for the province of York. Each diocesan bishop has his court, called the consistory court, over which the chancellor of the diocese presides. The archdeacons have courts, which, however, have little to do. Each archbishop has an almost obsolete court of audience. There is also the court of the vicar-general, which deals with ecclesiastical offences committed by bishops, and a court for marriage licences.

The court of arches hears appeals from the consistory courts, and from it there is an appeal to the judicial committee of the privy council. Until 1833 these appeals were to the court of delegates of appeals, which dated from the time of the Reformation. The law administered in the church courts was mainly canon law. See Canon Law; Church of England; Ecclesiastical Law.

## ECCLESIASTICAL LAW IN ENGLAND

Harold Hardy, Barrister-at-Law, Author of *The Benefices Act*, etc.

*This article deals with Ecclesiastical Law, the main branch of which is that under which the Church of England lives and works. Another aspect of the same subject is dealt with under Canon Law. See also Church of England*

Ecclesiastical law may include all laws affecting any church or religious society; or, it may be restricted to the law which regulates a particular church controlled by the state, as, for instance, the established church of Scotland. In this article, however, ecclesiastical law means the law relating to the Church of England as administered in the courts of the country, including the common law based upon custom, the canon law, and statute law.

Ecclesiastical law relates to the officers, who are the archbishops, bishops and clergy, and the laity, who are persons not in Holy Orders; the government and discipline; the faith, form of worship, rites and ceremonies; the fabric of the church, vicarage house and buildings, and other forms of church property.

Ecclesiastical law is administered in the civil courts, and in the ecclesiastical courts which have both civil and criminal jurisdiction. It includes part of what is called the common law of England, based on custom; it also comprises a considerable body of statute law; while the canon law is binding upon the officers of the church and to some extent upon the laity. The chief officers of the church are the two archbishops, who exercise jurisdiction in their respective provinces of Canterbury and York. Each province is divided into dioceses, presided over by a bishop, who has an ecclesiastical court where cases, generally relating to church property, are tried before his law officer, the chancellor.

Archbishops and bishops are appointed by the crown, and are



consecrated. An archbishop is enthroned, whereas a bishop is installed. A bishop is in legal documents often styled the ordinary, because he is the judge in ecclesiastical cases, having ordinary jurisdiction in his own right, and not by way of delegation or as deputy. In England the bishops of London, Durham, and Winchester have seats in the House of Lords, together with twenty-one other bishops, who are summoned in order of seniority.

The other orders of the clergy are priests and deacons, who are ordained by a bishop and receive a certificate called letters of orders. Only a priest can have a cure of souls, which is committed to the incumbent of the parish. The appointment of the incumbent, who is called the vicar or rector as the case may be, is by the presentation of the patron of the living; followed by institution, by which the bishop entrusts him with the spiritual care of the parish; and induction, which invests him with the emoluments of the benefice. After institution, the incumbent can officiate in any consecrated building in the parish, and no other clergyman may do so without his consent, except under certain statutory provisions. An incumbent is like a tenant for life in respect of the property belonging to the benefice.

#### Rights of Incumbents

He may cut timber for repairs, grant leases of, or sell, the glebe under certain conditions. He is liable for dilapidations of the vicarage house and buildings. He has possession and a limited ownership of the church and churchyard, but in many parishes a lay rector has certain proprietary rights in the chancel. He is entitled to the custody of the keys of the church, the registers of baptisms, marriages and burials, and has a general control over the organist and choir, the sexton and the bellringers. He appoints the curate, and by custom chooses one of the churchwardens, the other being elected by the parishioners at the Easter vestry. As a rule no one can be ordained priest until he has served as a deacon for the period of a year. The functions of a deacon are, generally speaking, the same as those of a priest, but he cannot have a cure of souls, nor may he consecrate or administer the Holy Communion. He may conduct morning and evening prayer, the services of baptism and of burial, and assist at the service of Holy Communion. He may also preach. And, if required, he may solemnise a marriage, though it is more regular for a priest to do so. No one can be ordained deacon

under the age of twenty-three, unless he has special permission from the archbishop of Canterbury.

The vestry is the council of the parish that deals with ecclesiastical matters. The right to attend and vote at a vestry meeting belongs to every parishioner of either sex whose name is registered in the rate book. The incumbent, or the clergyman acting for the incumbent, is the chairman of a vestry meeting, and he has a casting vote, if the votes are equal. The churchwardens are appointed annually at a meeting of the vestry, generally in Easter week.

#### Duties of Churchwardens

In an ancient parish, churchwardens must be resident in the parish. In the statutory parishes, the churchwardens are required to be "fit and proper persons," and must be members of the Church of England. The general duties of the churchwardens are the custody and care of the church property in the parish. Collections made in church "for church purposes" are under their control, but the offertories at Holy Communion are to be disposed of "to such pious and charitable uses as the minister and churchwardens shall think fit"; in case of disagreement, the bishop decides. They must provide the necessities for divine service, maintain order during its performance, and see that the church and churchyard are kept in a proper condition. The churchwardens have a right to arrange in what seats the congregation shall sit. They have no right of access to the church, chancel, or belfry without the consent of the incumbent, but if permission is refused on fitting occasions their remedy is by way of application or complaint to the bishop. It is the duty of the churchwardens to use all reasonable means for providing the necessary funds for church expenses with the assistance of the incumbent. After churchwardens are appointed at the Easter vestry, they appear at the next visitation of the bishop or archdeacon and are formally admitted to the office.

Parish clerks and sextons in ancient parishes are appointed according to custom for life, but may be removed from office for serious misconduct.

In some parishes the parish clerk also performs the duties of sexton, digging the graves and ringing the bell. In statutory parishes, created under the Church Building Acts, the clerk is appointed annually; but in parishes under the New Parishes Acts he is appointed for an indefinite period by the incumbent, who can dismiss him, with the consent of

the bishop, for misconduct. A clergyman may be appointed parish clerk, but he must be licensed by the bishop in the same way as a stipendiary curate, and the licence may be revoked subject to the right of appeal. Parish clerks and sextons are usually paid a small salary, and they are entitled to fees on marriages and burials.

The endowments for the maintenance of the clergy are derived principally from voluntary gifts made for the purpose in ancient as well as in statutory parishes. They consist chiefly of tithes, glebe lands, and funded property. A large portion of these are administered by the Ecclesiastical Commissioners (*q.v.*), who pay the income of the clergy out of the funds at their disposal. In many parishes the collections on Easter Day are given to the incumbent. There are also fees payable to the clergy on marriages and burials. The fees on baptism have been abolished. In every parish a register must be provided in which all baptisms are to be recorded by the incumbent or officiating minister, and a copy of the entries must be sent each year to the registrar of the diocese by the churchwardens. The entry is evidence in law as to the names and condition of the parents, but not as to age.

#### Ecclesiastical Courts

There are ecclesiastical courts in the various dioceses in England and Wales in which the judge is called the chancellor. These courts have both civil and criminal jurisdiction over ecclesiastical matters within the diocese. In civil suits petitions are presented for a faculty or licence to make alterations in the church or churchyard, and a citation is posted at the door of the church which gives notice of the proposed alterations to the parishioners so that they may have an opportunity of bringing any objection they may have before the court. The criminal jurisdiction is exercised when an offence against the ecclesiastical law has been committed.

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**Ecclesiastical Titles Act.** Act passed by the British Parliament in 1851. It was a reply to the brief of Pope Pius IX which restored the Roman Catholic hierarchy in England, making Westminster an archbishopric and selecting various towns, not occupied by Anglican bishops, as new seats for the episcopate. In response to Protestant political agitation Lord John Russell introduced the bill, which was passed into law. The Act was from the first a dead letter, and was repealed in 1871.

**Ecclesiasticus.** Name in the Vulgate of one of the most important of the O.T. Apocrypha, which in the Greek version is called the "Wisdom of Jesus, son of Sirach." The book was called Ecclesiasticus ("belonging to the Church") because, though not canonical, it was considered suitable for use in the public worship of the Western Church. By the decree of the Council of Trent it was declared a canonical book of the O.T. in the Roman Catholic Church.

It was originally written in Hebrew, between about 190 and 170 B.C., by Jesus the son of Sirach, and was translated into Greek soon after 130 B.C. by a grandson of the same name. The Hebrew text was lost until 1896, when Mrs. Agnes Lewis discovered a fragment in Palestine. Subsequently other fragments came to light, and now the greater part of the work may be read in Hebrew. The book belongs to a class of Hebrew literature known as Wisdom Literature. The author gathers up ethical proverbs, precepts, and wise sayings concerning a great variety of matters in the conduct of life. See Apocrypha.

**Ecclesiazusae.** Comedy of Aristophanes, produced 392 B.C. It represents the women of Athens as controllers of public affairs and founders of a socialistic state in which property and husbands were held in common, as in Plato's republic. The title means Women in the ecclesia (general assembly).

**Ecclesiology** (Gr. *ekklesia*, church, assembly; *logos*, discourse). Science treating of the organization and development of Christianity and of ecclesiastical architecture and decoration, especially in regard to their liturgical significance. See Christianity; Church.

**Echegaray y Eizaguirre, José** (1832-1916). Spanish dramatist, poet, and politician. He was born at Madrid, and educated at its university. Before entering politics, 1868, he was a teacher of mathematics. He held office in the Radical-Monarchist government of 1872-73, as minister of education,

and in 1874 and 1905-6 was minister of finance. His versatility was extraordinary, and he was a director of commercial companies, as well as a philosopher and poet. In 1904 he won the Nobel Prize for literature. His dramas, numbering over eighty, have been translated into most European languages. He



José Echegaray y Eizaguirre, Spanish dramatist

is regarded as the founder of the new school of Spanish dramatists. His plays include *Mariana*, 1893, adapted in English, 1897, at the Court, and revived, with Mrs. Patrick Campbell in the title rôle, at the Royalty, 1901; *El Gran Galeoto*, 1881, produced in London, 1889, under the title of *Calumny*. He died Sept. 16, 1916.

**Echelon** (Fr., round of a ladder). Military term. Troops are said to be in echelon formation when the units are all facing in the same direction, are in parallel rows with intervals between their flanks, and units to the rear are on the flank of those in front of them. Battle-ships are in echelon when advancing in V formation, the apex leading.

**Echidna** (Gr.-Lat., viper). Spiny ant-eater of Australia and New Guinea, of which there are two species, the five-toed and the three-



Echidna. An egg-laying mammal of Australia

toed. They are egg-laying (Monotremata). The back of the head and body is covered with short spines, like porcupine quills, and the head is provided with a slender beak. In the breeding season the female lays a single egg, which is incubated in a pouch on the underside of the body. The echidna and the ornithorhynchus are the only mammals that have a cloaca (*q.v.*).

**Echinodermata** (Gr. *echinos*, hedgehog; *derma*, skin). Phyla or sub-kingdom of invertebrate marine animals. They comprise the feather-stars (Crinoidea), starfishes (Asteroidea), brittle-stars (Ophiuroidea), sea-urchins (Echinoidea), and sea-cucumbers (Holothurioidea); certain other orders are represented only by fossils. They are organized on a five-

parted symmetrical plan, though this is not at once evident in some of the sea-cucumbers. The skeleton consists of a soft integument in which is deposited carbonate of lime in the form of plates, bars, or spicules. Although there is no distinct head, there is a mouth on the underside, except in the sea-cucumbers, where it is placed at one of the two extremities. The alimentary canal is separated from the general body cavity.

The nervous system, which is not of a high grade, has its principal seat in a five-angled ring around the gullet, from which branches radiate in all directions. What was formerly considered to be a heart is now known to be the centre of the generative system. There is no heart; but there is a system by which the products of digestion are circulated. The most remarkable feature of echinoderm organization is the series of water-vessels known as the ambulacral system, from its function of supplying hydraulic power for locomotion.

The outer surface of the echinoderms varies in the several orders. In the sand-stars and brittle-stars it consists of overlapping plates which allow the rays to be thrown into horizontal curves. In the common star-fish and its near allies it is studded with hard bosses and short spines; and in the sea-urchins it is armed with long or short spines which move on ball-and-socket joints. There are also sense organs of varying character in the different groups. The starfishes have rudimentary eyes at the tips of the rays.

The echinoderms are of the widest distribution, being found in all the seas, at all depths. They are a very ancient group, for their fossil remains are found in the rocks as far back as the Ordovician period.

**Echinoidea** (Gr. *echinos*, hedgehog; *eidos*, form). Order of echinoderms containing the sea-urchins. They include regular urchins, of which the somewhat spherical common sea-urchin (*Echinus esculentus*) of Britain's rocky coasts is a familiar example; the oval heart-urchins (*Spatangus*) of the sandy shores; and the depressed cake-urchins (*Clypeaster*) which are not represented in British waters.

The common sea-urchin has beneath its coat of about 4,000 bristling spines a thin stony box composed of nearly 600 five-sided plates, placed edge to edge. Through the minute perforations issue the delicate sucker tubes. Certain plates bear polished bosses upon which the spines turn in any direction. Each tapering spine has

a polished cup at its base to receive the boss, and the two are held together by muscular tissue. Among the spines will be found stalked and sessile organs resembling the bills of birds, which have the power of snapping. Around the Mediterranean the sea-urchin is esteemed as food; hence its name *esculentus*.

The heart-urchins, which burrow in muddy sand, are clothed with silky bristles, all pointing backwards. The scoop-like mouth is at the broad end and without teeth.

**Echo.** Reflection of the air waves by which sound is propagated. *See* Sound; Wave Theory.

**Echo.** In Greek mythology, a mountain nymph. At one time the companion of Hera, having displeased the goddess, she was punished by being rendered incapable of speaking except when spoken to. Subsequently Echo fell in love with the beautiful Narcissus, but, her love not being returned, she pined away and was changed into a stone which retained the echo or answering voice.

**ECHO, THE.** London independent Radical evening halfpenny newspaper, started by Cassell & Co., Dec. 8, 1868, with Arthur Arnold as editor. Sold in 1874 to Baron Grant, who made it a Conservative organ, it passed into the hands of John Passmore Edwards, who restored its former political character and made it a first-class property. In 1884 Andrew Carnegie became part proprietor, but Mr. Edwards soon reacquired the paper, and it remained under his control until 1897. It ceased publication in 1905. Another evening Echo appeared from The Daily Chronicle office in the spring of 1915, and after running for six weeks was amalgamated with The Star (*q.v.*).

**Echo Mountain Observatory.** Observatory, 3,500 ft. high, on Echo Mountain in the Sierra Madre Mts., California. It has a 16-in. equatorial telescope. The observatory was founded at the end of the 19th century by Thaddeus S. C. Lowe, an American scientist and inventor, who did much pioneer work in aeronautics and the investigation of the upper atmosphere, and invented the first apparatus in the U.S.A. for making artificial ice. A cable rly. runs up Echo Mountain to the observatory, and on the adjacent Mt. Wilson is the famous observatory of the Carnegie institution. *See* Observatory; also *illus.* p. 715.

**Echo Organ.** Small organ of delicate tone, either placed at a distance from the main organ or enclosed in a box, or both, in order to produce distant effects.

The idea dates back at least to the Restoration, but the introduction of electric mechanism has greatly extended its possibilities. Good examples are the celestial organ at Westminster Abbey and the altar organ at S. Paul's Cathedral, London. *See* Organ.

**Echternach.** Town of Luxembourg. It stands on the Sure, near the frontier of Prussia, and is famous for its annual festival and its association with S. Willibrord. In the church, a Romanesque building of the 11th century, restored in the 19th, are the remains of the saint. There was a rich Benedictine abbey here until 1801. The festival, which dates from 1300 or earlier, is held every Whit Tuesday. It is attended by pilgrims and invalids, as well as high ecclesiastics, who are accompanied by a singing and dancing crowd as they go in procession to the church. Echternach has a town hall and some small industries. Pop. 4,300.

**Echuca** (formerly Hopwood's Ferry). Town of Victoria, Australia. It stands on the Murray river, 156 m. by rly. N. of Melbourne. It is the chief river port on the Murray at its junction with the Campaspe. A bridge (railway and roadway) 1,905 ft. in length spans the river here, connecting with Moama in New South Wales. Echuca is the outlet for the wine, wool, and timber of this district. A private line 45 m.



Ecija, Spain. The principal square, with the municipal building

long to Deniliquin, on the Edward river, taps part of the N.S.W. Riverina trade. Pop. 4,137.

**Ecija** (anc. *Astigi*). Town of Spain, in the prov. of Seville. It stands on the Genil, here crossed by an old bridge, 34 m. by rly. S.W. of Córdoba. Ecija, once a Roman colony (Julia Augusta Firma) and a Moorish town, retains many traces of ancient civilization. It is now occupied in the manufacture of boots and shoes, and cotton, wool, silk, and linen fabrics. The surrounding fertile plain produces corn, cotton, and

fruit; the vine is largely cultivated, and a fine wine is made. From its climate Ecija is popularly called the *Frying-pan* of Andalusia. Pop. 23,217.

**Eck, JOHANN MAIER VON** (1486-1543). German theologian. Born at Eck, in Swabia, Nov. 13, 1486, his father's name being Maier, he took the name Eckius from his birthplace. Having studied at Heidelberg, Tübingen, and elsewhere, he was ordained priest in 1508. Two years later he became professor of theology at Ingolstadt University, with which he was associated for the rest of his life. He was the ablest opponent of the Reformation in Germany. In June-July, 1519, he debated



Johann von Eck, German theologian

publicly at Leipzig with Luther and Carlstadt, and in the following year wrote a treatise on the Primacy of Peter, and went to Rome. He returned with the papal bull excommunicating Luther (*q.v.*). Eck organized the Catholic Federation, and took a prominent part in successive conferences and diets at Ratisbon, 1524; Baden, 1526; Augsburg, 1530; and Worms, 1540. His German version of the Bible was published in 1537. He died at Ingolstadt, Feb. 13, 1543.

**Eckermann, JOHANN PETER** (1792-1854). German writer. He was born at Winsen, Hanover, Sept. 21, 1792. After early hardships he served in the war of 1813-14, and later studied at Göttingen. In 1822 he sent Goethe the MS. of his *Beiträge zur Poesie*, and this resulted in his going to Weimar, where he acted as secretary to Goethe, and assisted in the preparation of the final edition of his writings. He is best remembered by his *Gespräche mit Goethe* (1836-48), Eng. trans. *Conversations with Goethe*, John Oxenford, 1850. He died at Weimar, Dec. 3, 1854.



J. P. Eckermann, German author

**Eckhardt, JULIUS VON** (1836-1908). Russo-German diplomatist and author. Born at Wolmar in Livonia, he was educated at St. Petersburg and Berlin universities. He founded with Bärens the *Rigasche Zeitung*, a periodical advocating German expansion in the Russian Baltic provinces. He resided in Germany from 1867, and was connected with the journal *Grenzboten*, 1867-70. A noted Pan-Germanist, he was appointed privy councillor of Prussia in 1884, and became German consul at Tunis, Marseilles, Stockholm, Basel, and Zürich. His works included *The Baltic Provinces of Russia* (2nd ed. 1871), and *Berlin-Vienna-Rome*, in which he advocated German expansion by means of a customs union of Central European powers.

**Eckhart, JOHANNES** (c. 1260-1327). German mystic and theologian. Born at Hochheim, near Gotha, he became a Dominican friar, and in 1298 was prior of Erfurt and provincial of Thuringia. In 1300 he was lecturer in Paris, and in 1307 he was vicar-general of Bohemia and provincial of Saxony. He was subsequently lecturer at Paris, Strasbourg, and Frankfurt, and from 1320 until his death was professor at Cologne. Certain expressions used by Eckhart were condemned as heretical, and he was suspected of pantheism. But he made complete repudiation of error and submission to Rome.

Eckhart, who is known as the Master, was the founder of German mysticism. His writings do not present a definite system of philosophy, and his teaching is mainly concerned with the Divine essence in all things, the relation of the human soul to God, and the attainment of God by casting off all that hinders knowledge of God. No complete Eng. trans. of his works exists. For the German see *Deutsche Mystiker des 14 Jahrhunderts*, ed. F. Pfeiffer, 2nd. ed. 1907.

**Eckington.** Parish and town of Derbyshire, England. It stands on the Rother, 6½ m. S.E. of Sheffield by the G.C.R. Agricultural implements are manufactured, and there are coal mines in the neighbourhood. Market day, Friday. Pop. 12,164.

**Eckmühl, BATTLE OF.** Victory of Napoleon over the Austrians, April 22, 1809. In an attempt to reopen his communications, which had been broken by the French, the archduke Charles emerged from Ratisbon to give battle. His troops were routed by Davout and Oudinot, and the whole Austrian army was demoralised and forced

across the Danube. For his part in the day's success Davout was created prince of Eckmühl.

**Eclecticism** (Gr. *eklektikos*, picking out). In philosophy, a method which, while not excluding independent thought, selects and works up into a whole what is acceptable in other philosophical systems.

The most important Greek representative of this practice, which first made its appearance in the Stoic school, was Antiochus of Ascalon (1st century B.C.), the head of the so-called Fifth Academy, whose teaching led to the adoption of eclecticism by the Academy in place of scepticism as its ruling principle. Among the Romans, Cicero, who attended his lectures at Athens, although by no means an original thinker, skilfully selected and combined Sceptic, Stoic, and Peripatetic doctrines. Among modern eclectics Leibniz and Victor Cousin may be specially mentioned.

**Eclipse** (Gr. *ekleipsis*, failing). In astronomy, the passing of one celestial body between another and the observer. The term is usually restricted to the eclipses of the sun and moon and those of the satellites of planets by their primary.

It is clear that if the earth, the sun, and the moon moved in the same plane, there would be an eclipse each time the three were in a straight line. Since, however, the moon moves in an orbit inclined at an angle of 5° 8' to the plane of the sun's path, the ecliptic (*q.v.*), there can only be an eclipse when the three bodies are in an approximate straight line at the moment the moon is crossing the plane of the ecliptic. The points where the moon crosses the ecliptic are called the nodes, and when new moon happens at one of these nodes there will be an eclipse of the sun. When full moon occurs at one of the nodes the earth is between the moon and the sun, and there will be an eclipse of the moon by the earth's shadow.

The eclipse of the moon by the shadow of the earth will be more or less visible to the whole side of the earth turned away from the sun. The moon casts only a restricted shadow on the earth, and therefore the sun will appear in

eclipse only in the path of this moving shadow.

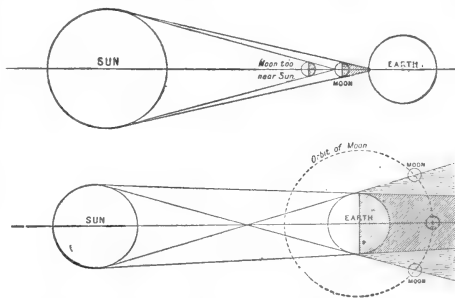
Owing to the refraction of the sun's rays the moon is hardly ever quite swallowed up in blackness. The eclipses, however, of 1642, 1761, 1816, and Oct. 4, 1864, were notable for the complete disappearance of the moon.

A total lunar eclipse may last about 1 hour 45 minutes. If the moon is not exactly at the node at its eclipse, a partial eclipse may result, the lower or the upper limb of the moon being obscured by the umbra, or darker portion of the earth's shadow.

In a total eclipse of the sun by the moon the diameter of the moon's shadow cast on the earth averages only about 150 miles and sweeps across the earth from W. to E. with great rapidity. The eclipse can only be visible in places swept by the shadow, and the longest time the total eclipse of the sun by the moon can be visible at any place is a little more than seven minutes.

Partial eclipses occur when the new moon is not quite at the node; annular or disk-like eclipses are due to the fact that the moon is sometimes too far from the earth to hide the sun entirely from the view of an observer on the earth. The length of the cone of the moon's shadow varies with the moon's distance from the sun between 230,000 and 238,000 miles. The moon is sometimes as near as 221,614 miles to the earth, and sometimes 252,972 miles away, so causing the variation both in the appearance and the length of time of solar eclipses.

The maximum possible number of eclipses of the sun and the moon in any one year is seven, while the usual number is four. In 1920 there were four, two of the sun and two of the moon. Although there is no connexion between one eclipse of the sun or moon and the one immediately following, there is a



**Eclipse.** Diagram showing the phases of an eclipse of the moon by the shadow of the earth. Above, eclipse of the sun by the moon. When the moon is too near the sun there is an annular eclipse

cycle, known as the saros, of a little over 18 years of eclipses, and it was due to a knowledge of this fact that the ancients were able to predict eclipses of the moon, though since eclipses of the sun are very rare at any given place on the earth's surface, the similar sun cycle was overlooked.

Eclipses of the sun have been fruitful in discovery. The eclipse of 1868 resulted in the discovery of helium in the sun, 27 years before it was found to be a constituent of one of the rare earths, cleveite, while the eclipse of May 29, 1919, provided an opportunity to prove Einstein's generalised theory of relativity by showing that light was attracted by the sun and deflected from a straight path.

In addition to the eclipses of the sun and moon, the eclipses of the satellites of Jupiter by their primary are of importance in astronomy. It was due to the studying of these eclipses, exactly analogous to the eclipses of the moon by the earth, that it was found light did not travel instantaneously. Closer approximations to the velocity of light and refinements in modern telescopes have enabled astronomers to use the eclipses of Jupiter's satellites to obtain the distance of the earth from the sun, the astronomical unit. See Ecliptic; Jupiter; Moon; Occultation; Sun.

**Eclipse.** English racehorse, regarded as the greatest that has ever lived. Foaled April 1, 1764, he was named because on that day there was an eclipse of the sun. He ran in his first race May 3, 1769, and from then until Oct., 1770, ran in 18 races, never being beaten. He was bred by the duke of Cumberland, but at the time of his successes was the property of D. O'Kelly. After 1770 he was used for stud purposes, and from him a large number of racehorses are descended. The horse's skeleton is in the Royal Veterinary College, Camden Town.

**Eclipse Stakes.** Race for horses of 3 years and upwards run at Sandown Park over a distance of  $1\frac{1}{4}$  m. It was inaugurated in 1884 and formed the first of the £10,000 races. Danny Maher rode the winner of this event on five occasions. One of the most popular wins was that of Orme, after recovering from his supposed poisoning, in 1892. The race was abandoned during 1915-18. See Horse Racing.

**Ecliptic** (Gr. *ekleiptikos*, relating to an eclipse). Track in the heavens along which the sun appears to perform its annual march. The sun's motion in this connexion is only apparent; it is the motion of the earth about the sun which pro-

duces the appearance of the sun's itinerary. The plane of the ecliptic is the plane of the sun's apparent, and of the earth's real, motion. The obliquity of the ecliptic is the angle ( $\Omega$ ) the ecliptic makes with the celestial equator. This can be determined by marking the apparent heights of the sun in the sky at the moments of its passing the meridian on June 21 and Dec. 21, and halving the difference in angular altitude. In London this is about  $23\frac{1}{2}$  degrees. The plane of the ecliptic is subject to variation, termed the secular variation of the obliquity of the ecliptic. See Sun.

**Ecligite** (Gr. *eklogos*, picked out). Crystalline, foliated rock, composed chiefly of omphacite and red garnet, with quartz, hornblende, etc., as minor constituents. When fractured, it presents a beautiful appearance, the red garnets sparkling in a light green matrix. Most frequently occurring as irregular masses in schist, it is found in Bavaria, Saxony, Silesia, Pennine Alps, and Scotland.

**Eclogue** (Gr. *eklogē*, selection). Pastoral poem relating the lives and loves of shepherds. Properly, almost identical with the idyll, the term is generally restricted to pastoral poems in dialogue form, such as the *Bucolics* of Virgil. Spenser set the fashion anew with his *Shepherds Calender*, and the form was much employed in the artificial poetry of the 17th and 18th centuries. The name has sometimes been used for dialogue poems other than pastoral, as in Phineas Fletcher's *Piscatory Eclogues* (1633) and John Davidson's *Fleet Street Eclogues* (1893-96).

**Enomus.** Headland on the S. coast of Sicily, between Girgenti and Licata. Off here in 256 b.c. the Romans under Regulus utterly defeated the Carthaginian fleet.

**École des Femmes, L'** (The School for Wives). Five-act comedy by Molière, first produced at the Palais-Royal, Paris, Dec. 26, 1662. The scene is in Paris. A selfish middle-aged bachelor, Arnolphe, brings up a young girl, Agnes, to make her his wife, keeping her ignorant of the world; but fails to prevent her from falling in love with Horace, a son of his old friend Oronte. Unaware of Arnolphe's relation to Agnes, Horace reveals to Arnolphe his love story. The lovers do not meet before the audience until the last act. Molière acted the part of Arnolphe.

**École des Maris, L'** (The School for Husbands). Three-act comedy by Molière, first produced at the Palais-Royal, Paris, June 24, 1661. The theme of two brothers, Ariste and Sganarelle, in charge of

two wards, sisters, whom they desire to marry, was suggested by The Adelphe of Terence. Ariste is generous as Sganarelle is mean and masterful. Molière acted the part of the latter. The scene of the play is laid in the French capital.

**Ecology** (Gr. *oikos*, house; *logos*, discourse). Science dealing with the relations of individual plants to their habitats. In this connexion are recognized vegetation-units or plant-communities, such as wood, moor, heath, implying particular kinds of soil as well as the plants associated with it, and plant associations, dealing with the characteristic vegetation of each unit.

In each of these associations one species usually dominates the others, and according to the situation and soil of the unit, many subordinate species will be associated with it which will interact upon each other by competition, cooperation, etc. The ecological botanist maps his district into areas, showing in each the dominant species and the subordinate species associated with it, the adaptations of the plants to their habitat, the influence of man in cultivating or draining land, the effects of the presence of herbivorous mammals in pasturing, of birds in dispersion of fruits and seeds, of insects in pollination and defoliation, etc. Thus ecology tries to explain why certain plants are successful in the struggle for existence, which plants are social in their habits, and which are solitary, and so forth. See Botany; Cytology.

**Economic Man.** Term used to describe man as discussed in the works of Ricardo, John Stuart Mill, and other political economists. He is a person who is actuated solely by material interests, who judges every transaction by the loss or gain afforded to him. Later writers have emphasised the fact that man is not actuated solely by material considerations, and have disputed his existence.

In the mass and in the long run men tend to act along certain well-defined lines, e.g. they tend to cease production which does not pay. Hence it is useful to conceive an average man whose family is of average size, whose needs are satisfied in an average way, whose work yields an average return, and so on. Such an imaginary economic man provides a ready standard of comparison. Just as the mathematician needs the perfect circle which does not really exist, so the political economist postulates an economic man for the study of his science. See Political Economy.



**Economics** (Gr. *oikos*, house; *nomos*, law). Originally the art of managing a household. This use survives in the phrase domestic economy, but there are also economics of other kinds. The most useful definition of the word is as a synonym for what is known as political economy, i.e. the study of the production and distribution of wealth. Economics is sometimes regarded, however, as having a somewhat wider meaning than political economy, including certain matters which were outside the scope of the older science; the physical welfare of the worker, for instance. Political economy is used for the main article in this work. *See* Political Economy.

**Economics and Political Science**, LONDON SCHOOL OF. School for the study of economics founded in London in 1895. It is a school of the university of London, and its courses are specially adapted for those who devote their time to research work, and also for those studying for degrees in economics. The subjects upon which professors and lecturers are provided include accounting, commerce, geography, sociology, statistics, and transport, as well as political economy, history, and law. The school occupies the Passmore Edwards Hall in Clare Market, London, W.C., but the foundation stone of new buildings was laid in 1920 by King George. Its principals have been Sir H. J. Mackinder, Hon. W. P. Reeves, and Sir W. H. Beveridge.

**Economiser**. Apparatus for heating the feed-water of steam boilers, and so reducing the consumption of fuel. The heating agent is either waste furnace gas or steam. The Green economiser, the type most commonly employed with Lancashire and other large cylindrical land boilers, consists of a number of vertical pipes, about  $4\frac{1}{2}$  ins. in diameter, arranged in a brick chamber interposed between the boiler and its chimney. Annular scrapers are moved mechanically up and down the outside of the pipes to keep them free from soot. Other forms of tubular feed-heaters are fitted in the uptakes of water-tube boilers, and in the fore part of large locomotive boilers. On ships exhaust steam or high-pressure steam is utilised to warm separate heaters, or the heater is combined with the condenser. The saving of fuel effected by an economiser may be from about 10 p.c. to about 15 p.c. *See* Boiler; Condenser.

**Economist**, THE. London weekly paper devoted to political economy. It was founded in 1843

by James Wilson, who edited it until 1859, Herbert Spencer being sub-editor, 1848-53. From 1859-77 the paper was edited by Walter Bagehot, and 1907-16 by Francis W. Hirst. It has always discussed financial questions from a social and economic standpoint, and in its early days was a staunch advocate of free trade and the repeal of the Corn Laws.

**Écorché** (Fr.). Animal stripped of its skin in order that the disposition and character of the muscles may be studied. In figure work the life class or study from nature supplies the bulk of the draughtsman's needs, but a species of écorché is supplied by the coloured plates of the muscular system used in some text-books of anatomy.

**E.C. Powder**. One of the oldest British smokeless powders for use in sporting guns. Invented in 1882 at the works of the Explosives Company, hence E.C., at Stowmarket, it consisted essentially of nitrated cotton mixed with nitrates, the mass being granulated. A separate company was formed to manufacture it at new works erected at Dartford, Kent, where it is still made. At present E.C. powder is a 33-grain powder, i.e. 33 grains of the smokeless powder is equivalent to the old standard charge of 82 grains of gunpowder. E.C. powder is composed of nitrocellulose, 79.0 p.c.; wood meal, 3.8; camphor, 4.1; barium nitrate, 7.5; potassium nitrate, 4.5; volatile matter, 1.1.

**Ecrasite** (Fr. *écraser*, to crush). High explosive employed in Austria for charging shell and other projectiles. It actually consists of ammonium cressylate, prepared by boiling trinitrocresol with a solution of ammonium carbonate, or by neutralising a solution of trinitrocresol with ammonia, the resulting product occurring as pale reddish yellow needles easily soluble in water. It melts at about 100° C., and is comparatively insensitive to friction and shock. Projectiles may be filled either by ramming and pressing the powdered explosive into them, by forming it into cartridges which are inserted complete through a removable base plate, or by pouring in the melted compound. It is detonated by means of a fulminate detonator and gains containing powdered ecrasite.

**Écrins**, BARRE DES. Mt. of S.E. France. It is the highest summit of the Pelvoux group of the Cottian Alps, which lie between the depts. of Hautes-Alpes and Isère. Alt. 13,460 ft.

**Ecstasy** (Gr. *ecstasis*, displacement, trance). Name given to various states of consciousness, in

which, the mind being concentrated on a definite object, the senses are temporarily inactive, and external sensations inoperative. It has been experienced at various times by many Christian mystics, notably by S. Teresa, and valued as a supernatural phenomenon. According to their own testimony the mystics have received, in ecstatic condition, special manifestation of the will of God. The term is also sometimes applied to the abnormal mental conditions of catalepsy, the hypnotic trance, somnambulism, and to the trances of spirit mediums. The chief points distinguishing these states from ecstasy are the absence of consciousness and of all memory of what has taken place during the trance. *See* Dreams.

**Ectoderm** (Gr. *ectos*, outside; *derma*, skin). Term applied to the outer layer of the embryo, from which the skin and nervous system of a vertebrate animal originate. It is also used for the outer layer of cells in the Coelentera. *See* Embryology.

**Ectopic Gestation or EXTRA-UTERINE PREGNANCY** (Gr. *ectopos*, out of place). Condition in which the fertilised ovum, or egg cell, instead of developing within the uterus, becomes implanted in the Fallopian tube which leads to the uterus, or escapes into the body cavity and there begins to develop. The cause is unknown. It is rare in young women, and is most often seen in women who have been married for a number of years without having had a child, and in cases where a long time has elapsed since the last pregnancy.

The symptoms are not very definite, but some of the signs of pregnancy may be present. Often, however, the first indication is a sudden attack of acute pain with collapse, and signs of internal hæmorrhage, due to rupture of the sac of the developing embryo. In most cases operative treatment provides the best hope of saving life. *See* Pregnancy.

**Ectozoa** (Gr. *ectos*, outside; *zōon*, animal). Term applied to parasites which live on the exterior of their hosts, in contrast with the entozoa, which live in the internal organs. Lice and ticks are examples of the ectozoa, tape worms and flukes of the entozoa.

**Écu** (Fr., shield; Lat. *scutum*). Obsolete French silver coin. First struck by Louis IX, its value was three livres. Charles VI issued, in 1384, a piece known as *écu de la couronne*, the *écu* being called in England a crown. There was also minted a double silver *écu* of six livres, worth about 5s. *See* Crown.

## ECUADOR: ITS RISE AND PROGRESS

F. A. Kirkpatrick, Author of *South America and the War*

*As in the case of other countries, this article describes the physical nature of the land before passing to its history, constitution, literature, etc. See South America, and the articles on the Chimborazo; Cordilleras, and other features*

Republic of S. America, lying between Colombia on the N. and Peru on the S. It is so named because the equatorial line runs through the country. Its western shores, 500 m. in extent, are washed by the Pacific Ocean. The Colombian boundary was settled by treaty in 1917, but the Peruvian frontier has not yet been fixed. The republic embraces the provinces of Azuay, Bolivar, Cañar, Carchi, Chimborazo, Esmeraldas, Guayas, Imbabura, Leon, Loja, Manabí, Obo, Pichincha, Los Rios, Tungurahua, the territory of Oriente, and the Galápagos archipelago. Its area is approximately 116,000 sq. m., and its pop. about 2,000,000.

The dominant geographical feature is the gigantic mountain system which traverses the land from N. to S. Two towering mountain ramparts, the Eastern and Western Cordilleras, run parallel to one another, enclosing between them a broad elevated valley, from 20 m. to 50 m. wide, and 8,000 ft. to 10,000 ft. above sea level. This trough is walled on either side by the famous "avenue of volcanoes," above a score of peaks in a double line, most of them rising far above the snow line, sometimes facing one another in pairs at heights of from 16,000 to 19,000 ft. No fewer than 20 of these summits can be counted from Quito, the capital, which stands on the central plateau at a height of 8,400 ft. The volcano of Pichincha (about 15,910 ft.) is notable for its perilous proximity to the capital; but most conspicuous among these mountains is the perfectly symmetrical and dazzling cone of Cotopaxi (19,600 ft.). Higher yet soars the imposing snow-clad mass of Chimborazo (20,500 ft.). And above the snows, volcanic craters emit their clouds and ashes. Several of them are dormant, but eruptions have been frequent since the coming of the Spaniards, and the whole region is subject to earthquake shocks and tremors. This vast mountainous region presents an endless variety of altitude and climate: the torrid, forest-clad plains bordering the lower spurs; the warm, temperate, pleasant, and

productive valleys of the moderate heights; the cool regions of the lofty plateau; and, higher yet, the páramos, or icy, wind-swept plains and slopes approaching the limit of perpetual snow.

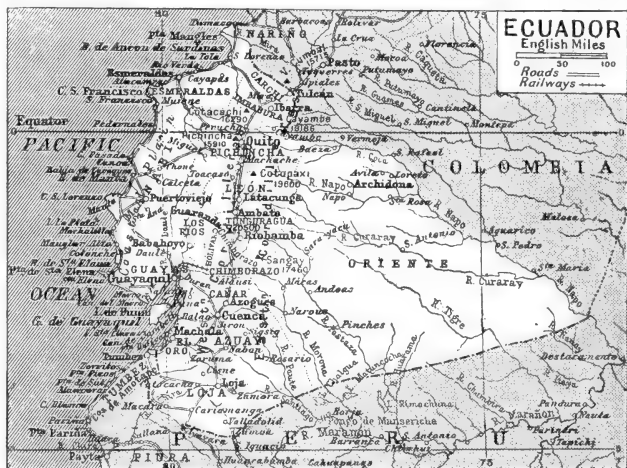
Although the mountains predominate, the greater part of Ecuador lies in the forest-clad plains which stretch to E. and W. from the foot of the two Cordilleras. In fact, Ecuador has three distinct zones: first, the coastal plain; then the Andine mountain system; and then the *montaña*, the densely wooded region stretching into the interior from the base of the Eastern Cordillera, and intersected by the multitudinous upper waters of Amazonian affluents.

The most valuable and productive part of the country is the broad coastal plain, richly tropical and humid in character. This plain, watered by innumerable streams and originally covered by dense forests, supports the extensive plantations of cacao, which supply

Through the towering wall of the Western Cordillera, lofty passes lead to the Andine plateau. From this plateau steep and difficult mountain passes lead eastwards, up between the peaks of the Eastern Cordillera, and then down along twisted and precipitous river valleys to the *montaña*, where scanty tribes of savage Indians support life by hunting with the blow-pipe and with poisoned arrows. This is the most inaccessible and least developed part of the republic.

This region resembles in its character the forests of Brazil; its woods and waters are haunted by a multitudinous variety of reptiles, saurians, fishes, birds, and insects. Trees, lianas, flowering shrubs, and rich orchids grow in countless varieties. The mammals include jaguars, pumas, tapirs, sloths, bears, deer, and armadillos.

The volcanic group of the Galápagos Islands lies on the Equator, 600 m. from the W. coast of S. America. Named from the gigantic tortoise (galápagos) found on the islands, they are remarkable for the fact that about half the indigenous plants, all the reptiles, and nearly all the birds are peculiar to this archipelago. In the 17th



Ecuador. Map of the South American republic which lies between Colombia on the north and Peru on the south. Its western shores are washed by the Pacific Ocean

the chief part of Ecuador's exports, besides plantations of bananas and other tropical products. Numerous streams, particularly those connected with the port of Guayaquil, provide access to the cacao plantations. The forest is valuable for its thickets of bamboo, and for the various products yielded by many kinds of palms, besides the palm-like plant whose fibre is woven into Panama hats.

and 18th centuries the islands, at that time uninhabited, were the resort of buccaneers and pirates. The government now maintains a penal settlement on the largest island, about 60 m. in length, and there are a few other inhabitants.

PEOPLE, LANGUAGE, ETC. The population is of mixed origin, descended partly from Spanish settlers, partly from indigenous

Indians, and partly—though in a less degree—from negro slaves imported in former days. Most of the people are pure Indians, simple and ignorant, who perform all the manual labour, and bear with a kind of customary apathetic submission the domination of the ruling class. These Indian peasants and labourers are virtually devoid of any sense of nationality or citizenship, and are indifferent to forms or methods of government, although they have been swept into contending armies, in numerous civil wars, by *caudillos* on either side. Some scanty tribes still subsist in primitive and savage independence in the eastern *montaña*; and others in the northern part of the coastal plain enjoy virtual independence under their *cacique*, who is recognized by the Ecuadorian government. The dominant class, which forms a society of typically S. American culture, is largely of mixed blood. The official language, and the tongue in general use, is Spanish.

**CONSTITUTION, RELIGION, ETC.** The president is chosen by direct popular election for four years. The 32 senators and 48 deputies are elected upon a limited franchise which is withheld from illiterates, an arrangement which secures ascendancy to the oligarchy of white, or quasi-white, blood. The Roman Catholic faith is generally professed, but is not officially established; all religions are tolerated. Primary education is free, and, in theory, compulsory. There is a small standing army, but no compulsory military service. The coinage is now upon a gold basis; the unit is the sucre, and the 10-sucres gold piece is equal to the sovereign.

**ECONOMIC CONDITIONS, INDUSTRY, ETC.** A large part of the world's supply of cacao comes from Ecuador, where cacao far outweighs all other products put together. The weaving of Panama hats is a considerable industry. Apart from this there is little in the way of manufacturing industry. The chief exports are cacao, *tagua* or vegetable ivory, Panama hats, coffee, hides, and rubber. Some gold is produced in the Andes, but mining is not, as yet, a developed industry. The considerable deposits of petroleum are for the most part still undeveloped. Guayaquil, the chief port and the largest town in the republic, is linked with Quito, the capital, by a mountain rly., 300 m. long, which traverses one of the passes of the Western Cordillera. There are also a few short lines connecting important points. The various streams which unite to form the river Guayas

provide access from Guayaquil to a large part of the cacao-bearing region of the southern coastal strip. The lower reaches are navigated by river steamers, the upper waters by canoes and rafts. But over the greater part of the country the only roads are bridle-paths, and mules are the only means of transport.

**HISTORY.** Before the European discovery of America, the mountain plateau was the seat of a monarchical native civilization, inferior to that of the Incas, but notable for its organization and marked by considerable skill in the arts of building, stone-carving, weaving, pottery, and the working of gold and silver. Towards the end of the 15th century the Inca monarch, Huayna Capac, defeated the king of Quito, and added his dominions to the Inca empire. By the daughter of the conquered chief, the Inca conqueror had a son Atahualpa, who, upon his father's death, became the Inca ruler of Quito. He then claimed the throne of the Inca empire, and dethroned his brother, the legitimate heir. He himself lost his kingdom and his life at the hands of Pizarro, the Spanish invader, in 1533. The conquest of Peru by the Spaniard was naturally followed by the occupation of Quito. The kingdom of Quito, which included a considerable territory now belonging to the republic of Colombia, constituted thenceforth a presidency or government, subordinate to the Spanish viceroy of Peru. But in the 18th century the presidency of Quito was made subordinate to the newly established viceroyalty of Santa Fé de Bogotá.

In 1808 a revolutionary or republican movement broke out in Quito; but, after four years of confused tumult, Spanish authority was re-established, and subsisted until the decisive victory of the republican commander Sucre in the battle of Pichincha in 1822. Quito was now incorporated into the extensive republic or federation of Colombia under the authority of Bolívar. But in 1830 that rather artificial political system was broken up into the three separate republics of Venezuela, New Granada (now Colombia), and Ecuador.

There followed a stormy period of personal rivalries, despotisms, factions, civil wars, and frontier wars with Colombia. From 1859 to 1875 the country was ruled by García Moreno, an ultra-clerical conservative, who attempted to set up a kind of Catholic theocracy, to be guided by the authority of the pope. His dictatorship, although more stable than previous governments, was by no means peaceful; and his assassination in 1875

opened a fresh era of disorder and conflict; nor can it be said that the promulgation of a new constitution in 1906 brought peace to the republic. However, Ecuador has had some share in that movement of economic progress which has transformed S. America generally during the past generation. In the Great War, Ecuador severed political relations with Germany, and was a signatory of the Peace Treaty.

**Bibliography.** *Travels in the Wilds of Ecuador*, A. Simson, 1886; *South America*, A. H. Keane, 2nd ed. 1909 (in Stanford's Compendium); *Travels amongst the Great Andes of the Equator*, E. Whymper, repr. 1911; *A History of South America*, C. E. Akers, 2nd ed. 1912; *Latin-America: its rise and progress*, F. García-Calderón, Eng. trans. B. Miall, 1913; *Ecuador*, C. R. Enock, 1914.

**Écurie.** Town of France, in the dept. of Pas-de-Calais. It is 3 m. N.E. of Arras and was the scene of fierce fighting between the French and Germans, Jan.–June, 1915. *See* Arras, Second Battle of; Artois, Battle of.

**Eczeema** (Gr. *ek*, out; *zein*, to boil). Inflammatory disease of the skin. Certain persons exhibit a marked predisposition to eczema, the exact cause of which is unknown. The immediate exciting cause may be debilitating illness, gout, Bright's disease, diabetes, constipation, dyspepsia, overwork, anxiety, and exposure to damp and cold winds. Infants and aged persons show especial susceptibility to it. A similar condition is produced by the action of certain irritants on the skin, e.g. turpentine, but this affection is better termed *dermatitis*.

The essential characteristics of eczema are: redness of the skin, formation of small blisters or vesicles, watery discharge, formation of crusts and scales, and usually extreme itching. Various types are recognized: erythematous eczema, in which bright red patches appear on the skin, papular eczema, characterised by the formation of small red papules or pimples about the size of a pin's head; vesicular eczema, marked by the appearance of crops of vesicles and watery discharge; and pustular eczema, in which pustules containing matter are formed, and on rupturing give rise to yellowish-brown scabs.

In all cases attention should be paid to the general health. The diet should be simple, alcohol should be avoided, rest of the affected part, if a limb, is important, and severe cases should be confined to bed. The irritated areas should be washed as little as possible and soap should not be used. Local treatment with ointments, powders,

lotions, etc., varies with the type of the condition and the stage it has reached. *Pran. ék-zem-a*.

**Edalji Case.** Beginning in Feb., 1903, and continued at intervals until the end of June, a succession of cattle-maiming outrages took place in the parish of Great Wyrley, Staffordshire. At the same time anonymous letters, purporting to come from the perpetrators, were sent broadcast throughout the district. It was mainly on the evidence of these that George Edalji, a young Birmingham solicitor, was arrested on Aug. 18, 1903. In Oct., 1903, he was tried at Stafford, found guilty, and sentenced to seven years' penal servitude.

A number of persons, including Sir Arthur Conan Doyle, R. D. Yelverton, and Edalji's father, the vicar of Great Wyrley, were tireless in their efforts to draw public attention to what they were convinced was a grave miscarriage of justice. In 1907 a commission of inquiry was appointed, and on May 17 the Home Secretary advised his Majesty to grant Edalji a free pardon, but without monetary compensation.

**Edam.** Town of the Netherlands, in the prov. of N. Holland. It stands on the Zuider Zee, 12 m. N.E. of Amsterdam. The name is derived from a dam built on the little stream Ye. Edam possesses some old brick houses, and a fine church, S. Nicholas, dating from the 14th century and restored, 1602-26. It is noted for its dairy produce, and in particular for the round red-rinded cheese which bears its name. Pop. 6,623.

**EDAR OR IDAR.** Native state of Gujerat, India, in Bombay presidency. It is bounded N. by Udaipur, E. by Dungarpur, and S. and W. by Bombay and Baroda. Area 4,966 sq. m. Pop. 250,000. The soil is generally fertile, but there are barren and stony tracts near the hills. The principal products are mangoes, sugar cane, oil seeds, and various kinds of grain. Its ruler is a maharaja entitled to a salute of 15 guns. Edar, the chief town, is 64 m. N.E. of Ahmedabad. Pop. 6,000.

**Edda.** Two collections of Icelandic literature, known respectively as the Elder, or poetical, of Saemund, and the Younger, or prose, of Snorri. The former were discovered by Brynjulf Sveinsson, an Icelandic bishop, in 1643. He attributed them to Saemund Sigfusson (1055-1132), but an earlier date is generally assigned by critics. The Prose Edda was compiled by Snorri Sturlason (1178-1241), and is generally ascribed to the 12th century.

**Eddington, ARTHUR STANLEY** (b. 1882). British astronomer. Born at Kendal, Dec. 28, 1882, he was educated at Owens College, Manchester, and Trinity College, Cambridge. In 1904 he was senior wrangler, and became fellow of Trinity, 1907. Eddington then devoted himself wholly to astronomy and was made chief assistant at the Royal Observatory, Greenwich. There he remained until 1913, when he was appointed Plumian professor of astronomy at Cambridge, next year becoming director of the university observatory. He wrote *Stellar Movements* and *The Structure of the Universe*, 1914; *Space, Time and Gravitation*, 1920. He contributes the article on Stars to this Encyclopedia. See photo, p. xxi.

**Eddoes.** Tuberous stems of several species of colocasia, caladium, etc., of the natural order Araceae. Though acrid in a raw state, they are used as food when cooked. *Colocasia antiquorum*, an E. Indian species, is largely cultivated for food, even in S. Europe, under the name of taro (q.v.).

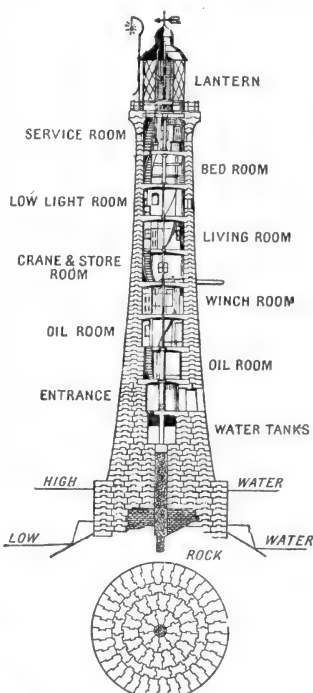
**Eddy.** Swirl in water caused by the meeting of two currents or by some submerged obstacle. A whirlpool (q.v.) is simply a large eddy.

**Eddy, MARY BAKER** (1821-1910). Founder of the religion named Christian Science and the Church of Christ Scientist. Born at Bow, New Hampshire, July 16, 1821, she received a liberal education, her father being a large landowner. She was married three times, first to Major George W. Glover, a contractor and builder, in Charleston, S.C., who died less than a year after his marriage. Her second husband was D. S. Patterson, a dentist of Franklin, N.H., who she divorced for desertion and infidelity in 1873. Her third husband was Asa Gilbert Eddy, who died 1875. She published *Science and Health with Key to the Scriptures*, the only textbook of Christian Science. Her other writings include *Miscellaneous Writings*; *Unity of Good*; *No and Yes*; *Rudimentary Divine Science*; *Church Manual*; *Pulpit and Press*; *Messages to The Mother Church*; *The First Church of Christ*; *Scientist and Miscellany*; *Christ and Christmas*; *Christian Science versus Pantheism*; and *Poems*. Mrs. Eddy died at Newton, Mass., Dec. 3, 1910. See *Christian Science*; consult also *Life*, Sybil Wilbur, 1908.



Mary Baker Eddy,  
Christian Scientist

**Eddystone.** Lighthouse on the Eddystone Rocks, a dangerous reef, 14 m. S.W. of Plymouth.



Eddystone Lighthouse. Diagram showing sectional elevation and plan of base

There have been four of them. The first, a wooden structure, 120 ft. high, by Winstanley, was destroyed by a hurricane in Nov., 1703, three years after its completion. The second lighthouse, 92 ft. high, was erected by John Rudyerd in 1709, and was burned down in 1755. The third, a granite building by Smeaton, 95 ft. high, was completed in 1759. It was the first in which the stones were dovetail jointed, and remained a model for other designs till 1877, when it was found necessary to dismantle it, as the rock foundation had become insecure; the upper sections were transferred to Plymouth Hoe. The present tower, completed in 1882, is located 40 yards from the previous one. Built of granite, with dovetailed stones, it is 168 ft. above low water, and is built in circular sections. The lantern shows a group flashing light of two flashes every thirty seconds, and has a range of nearly 18 m.

**Ede.** Town of S. Nigeria, W. Africa, in Yoruba country. It is 173 m. by rly. N.E. of Lagos, and lies at an alt. of 850 ft. Pop. 26,577.



Eddystone Lighthouse. The lighthouse built by Sir James Douglass in 1882. To the left are the remains of Smeaton's tower of 1759

**Edea.** Town of Cameroons, W. Africa. It stands on the Sanaga river and is a station on the line running inland from Duala, being about 50 m. from that port. The capital of the district of the same name, it is a centre for collecting palm oil and palm kernels. During the campaign in Cameroons a British and French force took the town, Oct. 26, 1914, the Germans making a futile effort to retake it in Dec., 1914, and in Jan., 1915. Pop. of district, 97,000. See Cameroons, Conquest of.

**Edelfelt,** ALBERT GUSTAF ARISTIDE (1854-1905). Finnish painter. Born at Helsingfors, July 21, 1854, he was trained at Antwerp Academy and at the École des Beaux Arts under J. L. Gérôme. He painted landscapes, portraits, and compositions with equal skill. Invited by Tsar Alexander III to paint the portraits of his children, he produced, while in Russia, several works in landscape and genre. He died at Borgia, Aug. 18, 1905. His finest and most characteristic works are Divine Service in the Skaergaard, at the Luxembourg; Pasteur in his Laboratory, at the Sorbonne; Laundry; Jesus appearing to Mary Magdalen, and Women in the Churchyard, both at Helsingfors.

**Edelinck,** GÉRARD (1640-1707). Flemish engraver. Born at Antwerp Oct. 20, 1640, he was the pupil of Gaspard Huberti and Cornelis Galle. Visiting Paris in 1665, on the invitation of Colbert, he practised there for the rest of his life, and is more properly classed with the French school. He



Gérard Edelinck, Flemish engraver  
After Rigaud

obtained ample patronage from Louis XIV, was received in the Academy in 1677, and died in Paris April 2, 1707. He became one of the most brilliant line engravers of the 17th century. In portraiture Edelinck was no less accomplished, his portraits of John Dryden and Philippe de Champaigne being of particular excellence.

**Edelweiss** (*Leontopodium alpinum*). Perennial herb of the natural order Compositae. A native of the mountains of S. Europe, and Himalaya, it is thickly coated with long woolly hairs, which give it a white appearance, accentuated in the bracts which surround the cluster of terminal yellowish flower-heads. The leaves are lance-shaped, and the plant is about 6



Edelweiss. Specimen of the plant, photographed on a mountain side

ins. high. It occurs locally in the Alps, but the idea that it is exceedingly rare and can only be gathered in circumstances of great danger is erroneous. The name is German, meaning "noble white."

**Eden.** English river rising on the borders of Westmorland and Yorkshire, and flowing N.W. past Kirkby Stephen and Appleby into Cumberland, and then past Carlisle to the Solway Firth, which it enters at Rockliff. Its length is 65 m., and it contains salmon.

**Eden.** River of Fifeshire, Scotland. It is formed by the confluence of two small burns, the Beattie and the Carmore, at the Kinross-shire border, and flows E.N.E. through the Howe of Fife and past Cupar to the North Sea, which it enters by a muddy estuary 6 m. in length; total length 30 m. There is good salmon fishing.

**Eden.** British destroyer. She displaced 550 tons, and had four 12-pdr. guns, two 18-in. torpedo tubes, and a speed of 25 knots. She was sunk in the English Channel as the result of a collision on the night of June 16, 1916. About 40 officers and men were lost.

**Eden,** GARDEN OF. In the earliest Biblical account (the Jahwistic) of Creation (Gen. ii, 8-25) Yahweh Elohim plants a garden eastward (from the Palestinian standpoint) in Eden (Gen. ii, 8) for man to dwell in. In the Septuagint the word for garden, Heb. *gan*, is represented by *paradeisos*, a loan-word (Hebraised *pardēs*) from the Zend *pairi-dāza*, "enclosure"; hence arises the term Paradise as a description of Eden and of the Christian Heaven. The garden of Eden seems to have been thought of as a park or pleasure-ground, in Gen. iii, 8, Yahweh Elohim is described as walking in the garden in the cool of the evening (cf. Isa. li, 3; Ezek. xxviii, 13, xxxi, 8). The name Eden has been derived from the Babylonian *ēdinu*, plain or steppe, but a more likely derivation is from the Hebrew *eden*, delight.

The location of Eden is difficult to determine. Sayce identifies the garden with the sacred garden of the Babylonian deity Ea at Eridu, the river which watered it (Gen. ii, 10) being the Persian Gulf, and the four branches (vv. 11-14) being the Palkopas, the Choaspes, the Tigris, and the Euphrates. E. Naville (Archæology of the O.T., 1913), comparing Gen. xiii, 10, "like the garden of the Lord, like the land of Egypt as thou goest unto Zoar," and identifying Zoar with the Egyptian Zar (mod. Kantarah), thinks that the narrator located the garden in Egypt in the western part of the Delta between the Tanitic and Pelusiac branches; Fall of the Nile. See Creation Legends; Fall.

**Edenbridge.** Market town of Kent, England. It stands on the Eden, 2½ m. S.S.E. of London by the S.E. & C. and L.B. & S.C. Rlys. It is an agricultural centre. Market day, Wed. Pop. 2,993.

**Edenhall.** Parish and village of Cumberland, England. It stands on the Eden, 3 m. N.E. of Penrith.



Edenhall. Drinking goblet and case known as the Luck of Eden Hall

From a drawing by C. G. Harper



At Eden Hall, the seat of the Musgraves, there is an ancient enamelled drinking goblet, known as the Luck of Eden Hall, which, according to tradition, was taken from the king of a fairy band feasting near S. Cuthbert's Well in the grounds, who, when departing, exclaimed:

If e'er this cup shall break or fall,  
Farewell the luck of Eden Hall.

In Longfellow's translation of Uhland's ballad, the glass is represented as having been destroyed. The mansion and estates were announced for sale in 1920. Pop. 256.

**Edenkoben.** Town of Bavaria, Germany. In the Bavarian Palatinate, it is 6 m. N. of Landau. The chief buildings are churches and schools. There are several manufacturing industries, while the town trades in wine. There is a sulphur spring. Near by is the villa of Ludwigshöhe. Pop. 5,400.

**Edentata** (Lat. *edentatus*, toothless). Order of mammals without front teeth, and in some cases without cheek teeth also. They comprise the sloths, ant-eaters, and armadillos, all of which are S. American. The pangolins and the aard-vark are sometimes also included in the order. Where cheek teeth are present in the edentates, they are of very simple structure, have no enamel, are without roots, and continue to grow throughout life. All the genera are land animals, and while the sloths and some ant-eaters live in the trees, the armadillos are burrowing animals. They are insectivorous, except the sloths, which are vegetable feeders.

The living representatives of this order are insignificant in number and degenerate in structure compared with those found in a fossil state. Fossil skeletons are found in the Pampa formation of S. America. See Mammals.

**Edessa.** An ancient city of Osroëne in the north-west of Mesopotamia, on the river Scirtos (Daisan). Founded by Seleucus I and called Antiocheia Kallirhoë by Antiochus IV, after the downfall of the Seleucid empire it became the capital of an independent kingdom from 137 B.C. to A.D. 216, under rulers called by the title Abgar (*q.v.*). It then became a Roman military colony, under the name of Colonia Marcia Edessenorum. After the division of the Roman Empire into East and West, Edessa became an important centre of Christianity. During the reign of Justin I it was destroyed by an earthquake and rebuilt as Justinopolis in 525. It is the modern Urfa (*q.v.*).

**Edfû** OR **ATBO.** Town in Egypt on the left bank of the Nile, 485 m. S.S.E. of Cairo. It is celebrated for its beautiful and almost perfect temple dedicated to Horus, one of the finest Ptolemaic buildings in Egypt; now that the temple of Philae is submerged this is the best example still to be seen. Edfû is the Greek Apollinopolis Magna. Pop. 12,594.

**Edgar** OR **EADGAR** (944-75). King of the English. The younger son of King Edmund, he became king as the result of a rising against his brother Edwy. The brothers were not apparently hostile to each other, but one party wanted Edgar for king and the witan decided that he should rule the land north of the Thames. In 959 Edwy died and Edgar became king of the whole country. His coronation, which did not take place until May, 973, is important in the history of that ceremony.

It was after this that the king sailed to Chester, and on the Dee was rowed by six or eight vassal kings. At this time he assumed a certain vague overlordship, his authority extending to Ireland, and called himself imperator. He fought against the Welsh, but his reign rightly earned for him the title of the peaceful. He formed a fleet for service against the pirates, and showed zeal in putting down crime. Edgar died July 8, 975, and was buried at Glastonbury. Two of his sons, Edward, called the Martyr, and Ethelred the Unready, succeeded in turn to the throne.

**Edgar Atheling** (d. c. 1130). English prince. The son of Edward the Exile and grandson of Edmund Ironside, he was born in Hungary, but was brought to England in infancy. After Harold's death in 1066 he was proclaimed king by the northern earls, and in 1068 and 1069 was involved in unsuccessful rebellions in the N. of England. Reconciled to William the Conqueror in 1074, he lived at his court in Normandy for twelve years. In 1097 he deposed the Scottish usurper

Donald Bane and seated his own nephew Edgar on the throne. He went on crusade in 1099 and in 1106 was taken prisoner at the battle of Tinchebrai while fighting for Robert of Normandy against Henry I. He was released, but the rest of his life was spent in obscurity. He died about 1130.

**Edge, SELWYN FRANCIS** (b. 1868). British motorist. Born in Sydney, N.S.W., he was brought to England in infancy. Having taken up cycling, he became the best 100-mile cyclist of his time, riding at Herne Hill track in 5 hrs. 6 mins., and covering the distance from London to York in 12 h. 50 m.

One of the pioneers of the motor industry in Britain, he founded the Motor Power Company in 1899, and later joined other leading firms, including that of Napier, by which name the cars of S. F. Edge, Ltd., were known. He won the Gordon-Bennett International Paris-Vienna race in 1902. See Cycling; Motoring.



S. F. Edge,  
British motorist  
*Elliott & Fry*

**Edgehill, BATTLE OF.** First battle of the Civil War, fought between Charles I and the parliamentarians, Oct. 23, 1642. The hill is a ridge in Warwickshire, on the borders of Oxfordshire. The king was marching from Shrewsbury to London, and the parliamentarians, under Essex, moved across to intercept him. On the morning of the 23rd Essex marched out of Kington to find the royalists drawn up on Edgehill, about 3 m. away. His artillery had not yet arrived, so he left the initiative to his enemies, who opened the fight.

Each army was drawn up with the infantry in the centre and cavalry on the wings. On both wings the royalist horse, under Prince Rupert and Wilmot respectively, drove the parliamentarians before them and followed them for miles. In the centre, however, the parliamentarians stood firm and the horsemen charged the royalist centre. Only the return of Rupert's following and the oncoming night saved Charles from utter defeat. Charles had about 14,000 men; Essex about 10,000.



Edgehill. The Warwickshire ridge on which the battle was fought, Oct. 23, 1642

**Edgeworth, MARIA** (1767-1849). British novelist. Born at Black Bourton, Oxfordshire, Jan. 1, 1767, she was one of the many children of Richard Lovell Edgeworth, whom she accompanied to Ireland in 1773. She spent most of her life on her father's estate at Edgeworthstown, obtaining her knowledge of the Irish peasantry from dealing with his tenants and her familiarity with fashionable life



*Maria Edgeworth*

from association with his neighbours, Lady Moira and Lord Longford. *Practical Education*, 2 vols. (1798), was written in collaboration with her father,

and it was largely on his account that she rejected a proposal of marriage made to her by Count Edelfrantz, a Swede, at Paris, in 1802.

Visits to London and the Continent between 1803 and 1844 brought her into touch with the best literary and fashionable society of her time, and in 1823 she visited Scott at Abbotsford, a visit returned by him at Edgeworthstown two years later. Scott's admiration of her literary ability is recorded in Waverley, where he declared that her presentation of Irish life and character had induced him to attempt a like service to his people in *The Waverley Novels*. In addition to the three novels of Irish life on which her fame is based—*Castle Rackrent*, 1800; *The Absentee*, 1812 (in *Tales of Fashionable Life*, vols. v and vi); and *Ormond*, 1817—she wrote the *Parent's Assistant*, 1796, enlarged ed. 1800; *Moral Tales for Young People*, 1801, and completed her father's *Memoirs*, 1820. The amiable and practical qualities displayed in her life distinguish Maria Edgeworth's books, which despite their didacticism still make a strong human appeal. She died May 22, 1849.

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**Edgeworth, RICHARD LOVELL** (1744-1817). British author. Born at Bath, May 31, 1744, he belonged to the English family that made their home at Edgeworthstown, Ireland. Educated at schools in

Drogheda and Longford, he went to Trinity College, Dublin, and then to Oxford. Of independent means, Edgeworth was able to devote his time to study, friendship, travel, and experiment. He was responsible for several inventions, was one of the early believers in the possibility of electricity, and had theories on education. He helped to found the Royal Irish Academy. From 1772 until his death, June 13, 1817, most of his time was spent in Ireland, looking after his estates and writing, while for a short time he sat in the Irish Parliament. His works include *Practical Education*, 1798, and *Memoirs*, parts of both being written by his daughter Maria.

**Edgeworth de Firmont, HENRY ESSEX** (1745-1807). Last confessor to Louis XVI of France. The son of an Irish clergyman, he was educated in France for the priesthood, and at ordination took the name of de Firmont from the Edgeworth family estate of Firmont, in Ireland. He settled in Paris, and in 1791 became confessor to Princess Elizabeth, and in 1793 to her brother, Louis XVI, whom he courageously attended to the scaffold. After several narrow escapes the Abbé Edgeworth, as he was commonly known, arrived in England, 1796, and subsequently became chaplain to Louis XVIII. He died at Mitau, May 22, 1807. See *The Abbé Edgeworth and his friends*, V. M. Montagu, 1913.

**Edging Plants.** Edging garden beds and borders with tiles, shells, wood, or bricks is now out of date. The only dead edging permissible is one of rough sandstone, carefully sunk into the ground almost to the level of the path, in order that creeping plants may hide it. The best permanent living edging is box, but this is of slow growth, though when once established, and annually clipped, it will flourish for generations. The most satisfactory quick-result edging is Virginian stock or dwarf nasturtiums, while more pretentious subjects, and those which possess longer lasting properties, are some of the saxifrages, stonecrops, pansies, dwarf veronicas, and white pinks.

It is a good plan while permanent edgings are establishing themselves to plant such quick-growing annuals as Virginian stock or dwarf

nasturtiums as temporary stop-gaps. Culture and treatment are the same as for the rest of the inhabitants of the bed or border. Dwarf edible peas were occasionally planted as war-time economical edging plants, with good results both from an ornamental and profitable point of view.

**Edgren, ANN CHARLOTTE LEFFLER, DUCHESS OF CAJANELLO** (1849-92). Swedish novelist and dramatist. The daughter of Prof. Leffler, a mathematician, she was born near Stockholm, Oct. 1, 1849, and married G. Edgren in 1872. Her earlier tales were issued under the pen-name of Carlot, but in 1882 she began a series of novels and plays under her own name, and many of these, with their modern note, enjoyed considerable success. One of the plays, *Sanna Kvinnor*, 1883, was translated into English by H. L. Brackstad as *True Women*, 1890. In 1890 she married the Italian mathematician, the duke of Cajanello, and died at Naples, Oct. 21, 1892.

**Edgware.** Small town of Middlesex, England. It is  $8\frac{1}{2}$  m. from the Marble Arch, on the high road to St. Albans. Formerly called Eggesware and Edgworth, and once the first village of note on the Watling Street, its manor has been since 1443 the property of All Souls College, Oxford. The W. side is in the parish of Little Stanmore. The parish church of S. Margaret, rebuilt 1765 and 1845, has a square stone tower, and is said to have been part of a monastery; near it was a house of refreshment for the monks of St. Albans as they travelled to and



Edgware. Parish Church of S. Margaret, viewed from the east

from London. Of the old inns. The Chandos Arms has a fireplace from the mansion of Canons (*q.v.*).

At Edgware was the forge of William Powell, whose work on the anvil is said to have suggested to Handel the melody of *The Harmonious Blacksmith*. Piper's

Green preserves the tradition that a former lord of the manor provided a minstrel for the amusement of the tenants in his service. Brockley Hill, 1 m. farther N., is supposed to be the site of the Roman station Sulloniaca. Edgware has stations on the G.N.R. and on the extension of the Hampstead tube rly. Pop. 1,233.

**Edible Birds' Nests.** Nests of certain species of swift (*Collocalia*), found in Australia and the East Indies. They are composed chiefly of the saliva of the birds and are attached to the walls of caverns. The Chinese value them as a delicacy

and convert them into a kind of glutinous, but almost tasteless, soup.

**Edict** (Lat. *edictum*). Promulgation, on his entry upon office, by a Roman magistrate, especially a praetor, of the principles upon which he intended to administer the law during his term. The result of this practice was that side by side with the civil law there grew up a great body of magisterial law which ultimately became the most valuable part of Roman jurisprudence. The word was also used later, especially in France, for certain laws, e.g. the edict of Nantes. See Praetor; Roman Law.

Calton Hill, with its public buildings and monuments, which include the unfinished national memorial, the prison, a cemetery, and the city observatory. There is a new prison at Saughton. There are many other notable buildings, including some careful restorations. Among these are the Mercat Cross in the High Street, restored by Gladstone; John Knox's house near it; Moray House; the White Horse Close in the Canongate; Riddle's Close, and the 17th century house restored by Lord Rosebery, in the Lawnmarket. More modern are the county buildings, the public library, and the sheriff court buildings. There are a number of statues and memorials.

Edinburgh is famed for its educational advantages. The university, specially equipped for training in medicine and surgery, occupies the site of Kirk o' Field. The Heriot-Watt College, George Watson's College, Fettes College, and the Royal High School are widely known. There are also several theological colleges, while here are the headquarters of the Scottish colleges of surgeons and physicians. The chief paper is The Scotsman.

#### Edinburgh and Leith

Edinburgh is governed by a council, presided over by the lord provost. It sends five members to Parliament. There is a good supply of water, gas, and electricity, while the city has an excellent system of tramways, which also connect it with Leith and other adjacent places. The city boundaries have been enlarged several times, and they now include Granton, Liberton, Portobello, and Duddingston, and the various hills around them. In 1920 an Act was passed for the inclusion of the port of Leith in the municipality of Edinburgh.

In primitive times, when what is now Scotland was peopled by tribes chronically at war with each other, but combining on occasions against some powerful invader, isolated crags or mounts were highly esteemed for defensive purposes. Among numerous sites of that character in northern Britain, none stands out more conspicuous than the Castle Rock of Edinburgh, which would no doubt be seized by the early colonists of Lothian and fortified by the usual rampart of stone and palisade. Within the enclosure they planted their wattled huts, and subsisted by the chase; for according to Strabo (25 B.C.), and Dion Cassius (c. A.D. 150-235), the natives of Northern Britain were ignorant or independent of agriculture when the Roman legions arrived there.

Of Edinburgh as a town, nothing

## EDINBURGH: THE CITY AND ITS HISTORY

Right Hon. Sir Herbert E. Maxwell, Bart.

*To Sir H. Maxwell's account of the history of Edinburgh there has been prefixed a description of the city as it is to-day. Special features, e.g. Arthur's Seat; Canongate; Greyfriars; Holyrood, are dealt with separately. See also Scotland*

The capital of Scotland and of the county of Midlothian stands on the S. side of the Firth of Forth, 390 m. N.N.W. of London. The pop. is 420,281, and the rateable value is estimated at about £3,000,000. The hills on which it is situated and those around it, of which Arthur's



Edinburgh city arms

Seat is the most notable, give it a most picturesque appearance, and this, increased by the nature and grouping of its buildings, have won for it the title of the Modern Athens. Its historic and literary associations added to this entitle it to be numbered among the famous cities of the world.

Edinburgh is a station on the N.B. and Cal. Ry., both of which lines have here fine stations, hotels, etc. As the capital of the country it has many public offices, and here reside a large number of civil servants, lawyers, etc. It is a great centre for insurance and banking business, while it has many warehouses for its distributing trade. Its chief industries are printing and brewing, but there are many others, including distilling as well as paper-making, and others auxiliary to printing. By means of Leith, its port, it is connected by sea with the great ports of England and the world. Several important publishing firms have their headquarters here.

The oldest part of Edinburgh, affectionately known as Auld Reekie, lies between the castle and Holyrood. The former, originally a fortress on a rock and still retaining its military character, has been associated with many stirring

scenes; in it are S. Margaret's chapel, the banqueting hall, the arsenal, the armoury, and the old prison called the Argyll Tower. Holyrood House consists of a palace and remains of an abbey; the picture gallery is the chief apartment. Between the castle and Holyrood are Lawnmarket High Street and Canongate High Street, the lofty tenements of which, called "lands," give an idea of what old Edinburgh was like. The Parliament House, with its magnificent hall, now contains the Law Courts, and around it are modern additions erected for legal business. These include the Advocates' and Signet Libraries, whereof the former shares with the British Museum and the Bodleian Library of Oxford the privilege of receiving a copy of every book published in the United Kingdom. There still remain the Water Gate and some other vestiges of the city's walls and boundaries.

#### The City Churches

Of the many churches, the chief is that of S. Giles, rich in memorials of various kinds, with its most recent addition, the magnificent chapel of the Knights of the Thistle. Others are S. Mary's and S. John's, two episcopal ones, the former being the cathedral; and S. George's, S. Cuthbert's, and S. Andrew's, belonging to the established church. Free S. George's is the most famous of those belonging to the United Free Church. The Canongate and Tron churches are somewhat older. Greyfriars churchyard is an historic spot, as are the Grassmarket, the Cowgate, and the Tolbooth in the Canongate.

In the modern city the most interesting thoroughfare is Princes Street, overlooked from the E. by



1. John Knox's house, Canongate. 2. A bygone landmark: Head of the West Bow in the Lawnmarket. 3. West front of St. Giles's Cathedral. 4. Princes Street, showing the Scott monument. 5. Chapel of the Order

of the Friars. 6. St. Margaret's Chapel in the Castle with Mons Meg, the famous gun dated 1486. 7. The Castle from the Grassmarket. 8. Edinburgh as seen from the air (photo. Aircraft Manufacturing Co., Ltd.)

**EDINBURGH OLD AND NEW: PLACES OF NOTE IN SCOTLAND'S HISTORIC CAPITAL.**



Edinburgh. Map of the environs of the Scottish capital, including part of the Pentland Hills

appears, even in tradition, until after the conquest of Lothian by Eadwine, Saxon king of Deira (Yorkshire) and Northumbria, in the 7th century. It appears from King David's foundation charter of Holyrood in 1128, and Simeon of Durham's chronicle written in the same century, that King Eadwine was thus early regarded as the eponymus, for in both of these writings the place is called Edwines-burgh. The Gaelic branch of the Celts called it Dunedin; among the Welsh population of Strathclyde it was known as Dineiddyn or Mynydd-agneid, the latter name appearing to signify the mount of the Painted People or Piets. According to the Pictish Chronicle the Saxons held Oppidum Eden till they surrendered it to Indulf, son of Constantin king of Scots (954-962); but all is misty and vague until Malcolm III was persuaded by Queen Margaret to remove his seat of government from Dunfermline to Edinburgh, about 1060.

In 1128 David I founded the abbey of Holyrood, and empowered the convent to form the burgh of Canongate, which retained its separate jurisdiction until 1856, when it was united to the corporation of Edinburgh. The date of the erection of Edinburgh into a royal burgh is unknown. Doubtless it had already received a charter before David I (1124-53) made it his principal residence, but many years had to run before it was recognized as the capital of Scotland. The strategic importance of Edinburgh having been

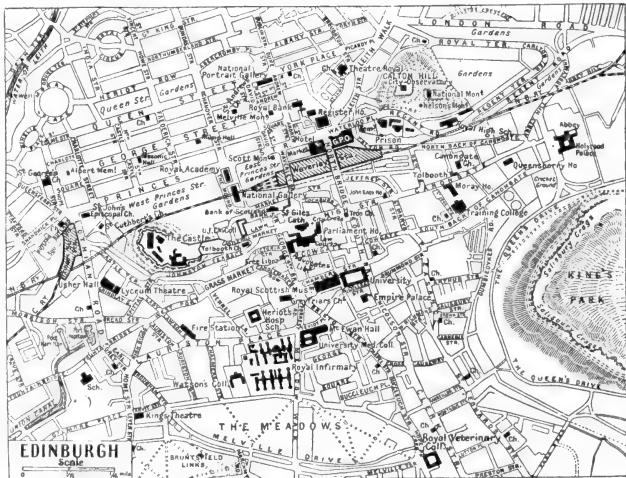
enhanced by the loss of Berwick in 1296 and Roxburgh in 1368, it became recognized as the most important town in Scotland, and increased steadily in population and commerce.

City and castle were taken by Edward III of England in 1335, but were recovered to the Scots by a clever stratagem in 1341. To the parliament summoned in 1357 for the special purpose of raising 100,000 marks for the ransom of David II, Edinburgh returned three burgesses, and appeared for the first time in precedence over all other burghs. It was sacked

and burnt by Richard II in 1385 and besieged by Henry IV in 1400, but the castle held out until Henry had to raise the siege in order to deal with Glendower's rebellion.

From this period onward Edinburgh, in common with the whole of Scotland, suffered from the arbitrary power of the great barons, who made full use for selfish ends of the opportunities afforded by the imprisonment in England of David II and James I, and by the frequency with which the succession to the throne devolved on an infant, the average age of seven successive sovereigns from 1406-1567 on their accession being but six years. Thus the 4th earl of Douglas, keeper of Edinburgh Castle, and a number of other nobles and officials, not only refused to pay the duties leviable upon wool and hides which they exported, but did not scruple to appropriate money which the customs officer had collected. In consequence, the gross customs of the city, which amounted to £2,047 in 1416, had fallen to £1,098 6s. 4d. in 1418, though the volume of trade was considerably greater. Bitter complaints of oppression were continually made to the government; Livingstone, guardian of the boy king James II, and Chancellor Crichton made these serve as excuse for ridding themselves of a dangerous rival, the 6th earl of Douglas, a lad of 17, whom, with his brother David, they lured to a banquet in Edinburgh Castle and had them both butchered in the king's presence.

In 1448 the Town Council, taking advantage of the respite of English invasion during the wars of the



Edinburgh. Plan of the central part of the city. The valley spanned by the North Bridge separates the Old Town on the S. from the New Town on the N.



Roses, set to work to strengthen the defences of their city. The king's garden on the N. side, now occupied by the Waverley rly. station and lines, was inundated by a dam thrown across the E. end, thereby forming the North Loch, whence a wall was built round the E. and S. sides of the city to the Castle Rock near the West Bow.

During the reign of James IV (1488–1513) the revival of learning first made itself felt in Edinburgh. The guild of chururgeon barbers received a royal charter in 1505, to develop under a fresh charter in 1684 into the Royal College of Surgeons of Edinburgh. In 1507 the first printing press in Scotland was established in Edinburgh. But a new era of bloodshed was inaugurated on Flodden Field in 1513, where James IV was killed with the flower of Scottish nobility and gentry. In 1544 the earl of Hertford sacked and burnt Edinburgh, wrecked Holyrood Abbey, drove away the monks, and gutted the palace, but was repulsed in attacking the castle. He returned in 1547 under his new name of Protector Somerset, and completed the destruction of Holyrood.

#### The Scottish Reformation

In the 16th century Edinburgh became the vortex of the Scottish Reformation. Parliament enacted the establishment of the Protestant religion in 1560, proscribing the Mass under penalty of death. Queen Mary, returning as a young widow to the capital which she had left as a child of six years, found the churches stripped of all adornment, the altars wrecked, the clergy, secular and regular, of her own faith banished, while from the pulpits Knox, Bruce, and other zealots hurled vehement denunciation against the Scarlet Woman. Knox laid the foundation of that system of national education to which Edinburgh owes so much of her distinction as a seat of learning and letters; but, dying in 1572, he did not live to see the foundation of the university in 1583.

Queen Mary's personal reign covered no more than six stormy years, perhaps the darkest and bloodiest in the whole history of Edinburgh. Conspicuous among the crimes perpetrated were the slaughter in Mary's presence of her favourite, David Rizzio, in 1566, and the murder of Darnley in 1567.

The city, which is believed to have contained at the time some 30,000 inhabitants, suffered considerably in trade when James VI succeeded to the throne of England and removed his court to London. He promised to revisit Edinburgh every third year, but fourteen

years went by before he returned for the first and last time. Charles I was crowned in Holyrood in 1633, eight years after his accession—the only coronation ever performed in the Scottish capital, except that of James II in 1437. In 1637 the city was thrown into ferment when Charles sent Laud's liturgy to Edinburgh, with a command that it was to be used in all the churches. Edinburgh had been staunchly loyal hitherto; but this gave immediate birth to the National Covenant which was signed in Greyfriars Churchyard, Feb. 28, 1638. The obnoxious liturgy was withdrawn, Sept. 17, but things had gone too far; the Covenanters were under arms, and in 1639 Sir Alexander Leslie, one of Gustavus Adolphus's veterans, stormed and captured Edinburgh Castle. After the pacification of Berwick, it was handed back in 1640 to Sir Patrick Ruthven, who also had served long under Gustavus Adolphus, for the king; but when war broke out afresh in June, it was captured once more by the Covenanters under Leslie.

In 1642, when King Charles took the field against his Parliament, the people of Edinburgh were fervid Covenanters; but the Scottish privy council declared for the king by eleven votes to nine. On Aug. 2, 1643, the general assembly promulgated the Solemn League and Covenant, which sought to impose Presbyterianism by compulsion on both England and Scotland. Charles I having been executed Jan. 30, 1649, the Scottish Estates caused his son to be proclaimed king at the Mercat Cross of Edinburgh on Feb. 5, but the Covenanters would have none of him.

#### Covenanters and Anti-Jacobites

The duke of Hamilton, the earl of Huntly, and the marquess of Montrose were executed in succession in Edinburgh. Cromwell invaded Scotland, July 22, 1650, utterly defeated Leslie's Covenanters at Dunbar on Sept. 3, took possession of Edinburgh and proclaimed the Commonwealth. Ten years later, at the Restoration, "the Maiden," an instrument similar to the guillotine, was set to work at the Mercat Cross.

In 1688 the Edinburgh populace was vehemently anti-Jacobite. King James VII and II had escaped to France, but the mob overpowered the guard in Holyrood Palace; wrecked the abbey church, which had been redecored as the Chapel Royal, and, bursting open the royal burial place, scattered the bones of Scottish kings and queens. The duke of Gordon still held the castle for the king, and

his historic parting with Dundee, when that intrepid soldier rode from the Nether Bow to his death at Killiecrankie, forms the subject of Scott's lyric *Bonnie Dundee*.

The city was riotously convulsed during the proceedings in the Scottish Parliament over the legislative union with England in 1707. It was little affected by the Jacobite rising of 1715, but in 1745 Prince Charles Edward, after defeating Sir John Cope at Prestonpans, took possession of Edinburgh, proclaimed his father king James VIII at the Mercat Cross, and held a brilliant court at Holyrood for more than two months.

#### Intellectual Edinburgh

Notwithstanding the loss of custom and prestige caused by the departure of James I and his court in 1603, the misery and bloodshed entailed by the civil wars and religious persecution of the 17th century, and the further loss consequent on the union of Parliaments in 1707, Edinburgh continued to advance both materially and intellectually. Allan Ramsay the Elder, 1686–1758, who began life as a wig-maker, must be honoured as chief pioneer in the revival of literature, for he founded the literary coterie called the Select Society, reconstructed in 1755 as the Society for Encouraging Art, Science, and Industry. The torch which he kindled was passed from hand to hand by such writers as James Hamilton of Bangour, Thomson of The Seasons, David Hume the historian, John Home the tragedian, Dalrymple Lord Hailes, Home Lord Kames, Burnett Lord Monboddo, "Jupiter" Carlyle, Adam Smith, political economist, and Henry Mackenzie, the "Man of Feeling," who introduced Burns to Edinburgh society in 1787. These created a literary atmosphere which lingers in the Scottish capital to this day, having received fresh vigour from Jeffrey, Brougham, Lockhart, "Christopher North," and, most illustrious of all, Walter Scott.

Of social gaiety in Edinburgh there was no lack in the 18th century. Scotland had entered at the Union of 1707 on a period of prosperous industry which had been impossible during the war with England and the civil wars of the 17th century. The revival of agriculture set country gentlemen at work reclaiming waste lands; their increasing revenues enabled them to bring their families to town for the season to lodge in "lands" (flats, as they would be called now), erected high over the malodorous, crowded "wynds" and courts opening out of the High

Street. The Old Town, indeed, had become congested in a degree incompatible with common decency and sanitation. The narrow limits of the ridge whereon the city was built made lateral expansion impossible, unless the North Loch were drained away and a New Town laid out on the far side thereof. Plans were prepared by the architect James Craig, and the foundations of the first house in the New Town were laid on Oct. 26, 1767. The result has been the creation of one of the most striking urban landscapes that can be found in any country. The picturesque features of the Old Town have, indeed, been greatly impaired by the removal of at least two-thirds of the ancient "lands," as the lofty houses piled high on the ridge were called; but enough remains to offer striking contrast to the spacious streets and commodious architecture of the New Town. The scene would have been even more impressive had the North Loch been purified and retained as an ornamental sheet of water, instead of being drained away and its bed occupied by the North British Railway. But enough is left to justify the pride with which her citizens speak and think of Edinburgh as the Modern Athens, the Castle Rock being no mean counterpart to the Acropolis, while the Calton Hill reflects the contour and relative position of Lycabettus.

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**Edinburgh, ALFRED ERNEST ALBERT, DUKE OF (1844-1900).** The second son of Queen Victoria,



Alfred Ernest,  
Duke of Edinburgh  
Russell

he was born at Windsor Castle, Aug. 6, 1844. He was educated for the navy, and in 1893 was made admiral of the fleet. In 1862 he was elected king of Greece, but for political reasons he refused the crown. He was created duke of Edinburgh in 1865, and in 1893 became reigning

duke of Saxe-Coburg and Gotha, surrendering his privileges as an English peer, but retaining his rank of admiral. In 1874 he married Marie Alexandrovna, only daughter of Alexander II of Russia, who died Oct. 25, 1920. He died July 30, 1900, and was succeeded as duke of Saxe-Coburg by his nephew, Leopold Charles, duke of Albany (*q.v.*), as his only son had died, Feb. 6, 1899. The duke was a skilled musician, especially on the violin.

**Edinburgh, UNIVERSITY OF.** Founded in 1583, this obtained in 1621 the same privileges as the three other Scottish universities, which were confirmed at the time of the Union (1707). Alterations in its constitution were made in 1858 and 1889. Edinburgh has six faculties, arts, science, divinity, law, medicine, and music, and its professorships usually attract distinguished scholars. Except in divinity women are admitted to its courses and degrees equally with men. Its medical school is specially efficient; Edinburgh also pays much attention to agricultural education, and has courses for the training of teachers and army officers. In 1919-20 Edinburgh had 4,300 students.

The university is ruled by a university court, a university council, and the senate, while the city council has some share in its government. Its head is the chancellor, but the actual direction is in the hands of the principal. The lord rector, another honorary official, is elected by the students every three years. It unites with the other Scottish universities to send three members to Parliament.

The present buildings, begun in 1789, occupy the site of Kirk o' Field. Prominent among them are the hall and the library, which contains a most valuable collection of books and MSS. In Teviot Row are the extensive buildings of the medical school. The university has numerous and well-equipped laboratories and museums, and offers many scholarships to intending students. In 1919 a site of 115 acres for science laboratories was acquired on the southern outskirts of the city, between Mayfield and the Blackford Hill. On July 6, 1920, King George laid the foundation stone of the new buildings.

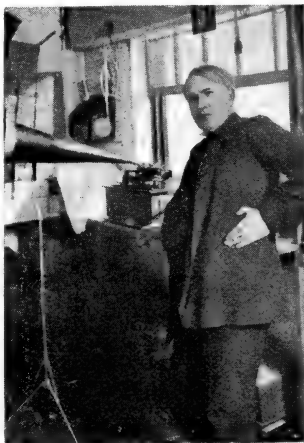
**Edinburgh ACADEMY.** Scottish public school. It was founded by royal charter in 1824, and the buildings near Stockbridge stand in grounds covering three acres. They include a school hall, gymnasium, rifle range, library, and five courts, as well as class-rooms, laboratories, etc. There is a pre-

paratory school. The total number of boys is about 650. Most of them are day boys, but there are three houses for boarders. The headmaster is known as the rector, and the school is governed by a board of directors. The Edinburgh Academicals, composed of old boys of this school, is one of the most famous of Scottish football clubs.

**Edinburgh REVIEW, THE.** First of the great critical quarterlies, but the second of the same name. Its predecessor was brought out in 1755, under Adam Smith, Alexander Wedderburn, and others, and only ran to two numbers. The famous blue-and-buff Whig organ was projected by Sydney Smith, who edited the initial number published at Edinburgh in Oct., 1802. Francis Jeffrey was editor, 1803-29, Macvey Napier, 1829-47, William Empson, 1847-52, Sir George Cornewall Lewis, 1852-55, Henry Reeve, 1855-95, Arthur Elliot, 1895-1912, and since 1912 Harold Cox. Francis Jeffrey's literary criticisms provoked Byron's English Bards and Scotch Reviewers. Lord Macaulay's Essays first appeared in the Edinburgh; other contributors were Lord Brougham, Lord Houghton, Lord John Russell, Robert Lowe, and John Stuart Mill.

**Edinburghshire.** Name of the county more correctly known as Midlothian (*q.v.*).

**Edison, THOMAS ALVA (b. 1847).** American physicist and inventor. He was born at Milan, Erie co., Ohio, Feb. 11, 1847, of mixed Dutch and Scottish descent. At the age of twelve he began life as a newsboy on the railway, and before long distinguished himself by set-



Thomas A. Edison

ting up and printing on the train a little news sheet, The Grand Trunk Herald. He learnt the elements of telegraph operating, and shortly after began to invent a remarkable series of improvements on the then crude methods of electrical transmission which revolutionised telegraphy throughout the world. The automatic repeater, the quadruplex and printing telegraph, and the sextuplex method of transmission followed in rapid succession.

While still a young man he set up an establishment largely devoted to experimental work in all branches of science. Here he brought to perfection the phonograph, the forerunner of the modern gramophone, the kinetoscope, out of which developed the cinematograph, and many other inventions which were practically fundamental. More than 900 patents have been granted to him for his inventions, and he has been honoured by innumerable scientific bodies and universities. During the Great War he designed benzol and carbonic-acid-producing plants on a large scale.

The range of Edison's inventions is such that he has left his mark on nearly every branch of science. Many of them, as the kinetoscope and phonograph, have resulted in the creation of entirely new industries and methods of thought and news distribution, while his improvements in telegraphic methods of communication may be compared with those of wireless due to Marconi. *See* Cinematography; Phonograph; Telegraph; consult also Lives, E. C. Kenyon, 1896; F. A. Jones, 1907; F. L. Dyer and T. C. Martin, 1910.

**Edith Cavell.** Mt. of Canada. A peak of the Rocky Mts., it is situated in Alberta, close to the border of British Columbia, 14 m. S. of Jasper on the G.T.P. Rly. It is about 11,000 ft. high, and was named after Nurse Edith Cavell (*q.v.*).

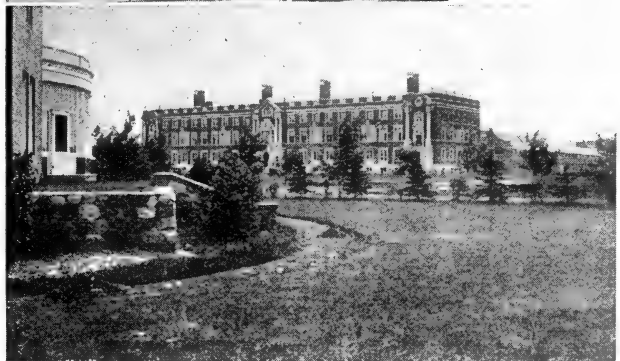
**Editor** (Lat. *edere*, to produce). One who controls the production and contents of a newspaper, book, or magazine. On daily newspapers his personality and political and business acumen and knowledge of men and affairs are more vital than literary facility, the necessity of his close attention to detail being obviated by subdivision of labour. In book and magazine production he needs special qualifications according to the nature of the work on which he is engaged. In all cases practical knowledge of the various processes connected with printing, illustration, etc., is essential. *See* Journalism; Newspaper.

**Edmonton.** Urban district of Middlesex, England. It stands near the New and Lea rivers, 2 m. N. of Tottenham by the G.E.R. and 2 m. S. of Enfield. It has some timber trade on the Lea, and the place is associated with Cowper and Keats. Charles and Mary Lamb lie buried in the parish churchyard. The National Aircraft Engine Factory built here during the Great War on a site of 14 acres, at a cost of £133,000, was purchased by a motor firm in 1919. One member is returned to Parliament. Pop. 64,797.

**Edmonton.** Capital of Alberta, Canada. It stands on a high tableland overlooking the N. bank of the North Saskatchewan river. 793

**Edmund** or **EADMUND** (841-70). Saint and king of East Anglia. Late legends describe him as the son of Alkmund, king of the Saxons, and state that he was born at Nuremberg and adopted by Offa, whom he succeeded as king of East Anglia in 855. Captured by the Danes on their invasion in 870 and refusing to give up Christianity, he was beheaded at Hoxne, Suffolk. His body was removed in the 9th century to Bury (now known as Bury St. Edmunds), where the famous shrine was erected. He was held in great veneration as a saint, many English churches are dedicated to him, and his festival is kept on Nov. 20. *See* Life, J. B. Mackinlay, 1893.

**Edmund** (c. 922-46). King of the English. The son of Edward the Elder and grandson of Alfred the Great, he succeeded his half-brother Athelstan in 940. He fought against the Danes in the north, the result being a division of the kingdom. This did not last long, as Edmund crushed the Danes in Mercia.



Edmonton, Canada. View of Alberta University, founded in 1906; above, the Parliament buildings of the province of Alberta

m. W. of Winnipeg. Served by the Canadian Pacific, Grand Trunk Pacific, and Canadian Northern Rlys., the city has grown rapidly in recent years. Edmonton's public buildings are substantially built and the churches have some architectural merit; the suburbs are extensive. There are large meat-packing plants, saw-mills, etc. The Hudson's Bay Co. established a post early in the 19th century, and it is largely to the fur trade that the city owes its prosperity. Pop. 61,045. *See* Alberta.

and was again ruler of the whole land. He subdued Cumbria in 945 and bestowed it on Malcolm, king of Scotland, on condition that he should be his "fellow-worker by sea and land." He was mortally stabbed by an outlaw at Pucklechurch, Gloucestershire, May 26, 946, and was buried at Glastonbury. Edmund's military victories and reforms in church and state gained him the name of the Deed-doer and the Magnificent. His two sons, Edwy and Edgar, became kings after him.

**Edmund** (c. 1175–1240). Saint and archbishop of Canterbury, known as Edmund Rich. Born at Abingdon, after studying and lecturing at Oxford and Paris he became in 1222 treasurer of Salisbury. He preached the Crusade in England, 1227, and on the nomination of Gregory IX was elected archbishop of Canterbury, 1233. Edmund vainly endeavoured to persuade Henry III to get rid of his foreign favourites, and was equally unsuccessful in establishing discipline amongst the monks at Canterbury, and in his protest against the provision of English benefices for Italian clergy. Finally in 1240 Edmund withdrew to France, where he died at Soissy. He is buried at Pontigny, and was canonised 1247. His festival is kept in the Roman Catholic Church on Nov. 16, the day of his death, and a college is dedicated to him at Ware. See Lives, F. de Paravicini, 1898, and B. Ward, 1903.

**Edmund Ironside** (c. 981–1016). King of the English. A younger son of King Ethelred the Unready, he appeared in public life about 1015. He was ruling Mercia, evidently as an under-king, when Canute invaded the land, and raised an army for its defence. Beaten, he was forced into Northumbria, and the war was raging when Ethelred died. Edmund was chosen king in London and Canute at Southampton, and the war between them was continued more fiercely than before. In Somerset the English king was victorious, and after a protracted battle at Sherston, in Wiltshire, he was left master of Wessex. He then fought battles to relieve London from the attentions of Canute, but then followed the terrible defeat at Assandun. After this the two kings met and decided upon a division of the kingdom, but Edmund had not reaped the benefit of this when he died in London, Nov. 30, 1016. He was buried at Glastenbury, and left two sons, Edmund and Edward. Edmund won his name by the personal bravery which he consistently displayed, and his fighting record of a single year.

**Edmunds, GEORGE FRANKLIN** (1828–1919). American politician. Born at Richmond, Vermont, Feb. 1, 1828, he became a barrister in 1849. From 1854–59 he was member of the Vermont house of representatives and Speaker of the lower house, 1856–59. Member of the state senate, 1861–62, he acted as president, and from 1866–91 he was member for Vermont in the U.S. Senate, and leader on the Republican side. In 1882 he was author of the Anti-Polygamy Act, known as the Edmunds Act, and

in 1890 of the Anti-Trust Law. After retiring from the U.S. Senate, 1891, he resumed practice and gained a leading position as a constitutional lawyer. He died Feb. 27, 1919.

**Edom.** District situated to the S. of Palestine. It stretched from the Dead Sea to the Gulf of Akabah, covering an area of about 100 m. by 20 m. The name Edom (red) is probably derived from the prevalent red sandstone of the district. Its first recorded inhabitants were a cave-dwelling race known as the Horites, who were conquered by Esau and his sons. During the Exodus, the inhabitants of Edom refused to allow the Israelites passage, and hence arose a feud which lasted till the end of the second century B.C. Both David and Solomon defeated them, but in the reign of Jehoram they threw off the yoke. Amaziah and Uzziah again subdued them, but after the fall of Judah they again became free till the days of the Maccabees, when they were finally crushed and forcibly proselytised by John Hyrcanus. The Edomites were polytheistic in religion, and marriages between their women and the Hebrews were a frequent source of trouble. The Herods were of Edomite origin. See Palestine.

**Edremid.** Variant spelling of the port of Asia Minor better known as Adramyti (*q.v.*).

## EDUCATION: ITS MEANING AND AIMS

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*In addition to this introductory article, the subject is considered under School; University; Co-education; Froebel System; Kindergarten, etc. See also the articles on the universities of the British Empire and on the leading colleges and public schools*

The uncertainty about the precise meaning of the term *education* is strikingly illustrated by the titles of four books: *The Meaning of Education*, N. M. Butler, 1898; *What is Education?* Stanley Leathes, 1913; *What do we Mean by Education?* J. Welton, 1915; *What is Education?* E. C. Moore, 1915. For practical purposes, however, it may be taken as generally agreed that education means whatever is done deliberately by one generation to pass on to its successors all that it has gained in the way of knowledge about how to make the most of life. The element of deliberate purpose is usually included in attempts to define education more or less scientifically.

In a general sense, men and women are being educated all their life, from the cradle to the grave. In Latin *educare* means really the bringing up of children. The French *élever*, the German *erziehen*, and the

**Edridge-Green, FREDERICK WILLIAM** (b. 1863). British ophthalmic surgeon and writer. Educated at S. Bartholomew's Hospital, Durham, and Cambridge, he devoted himself to original research on vision and colour perception, and invented the colour perception spectrometer and lantern which are used for official eyesight tests in the navy. He was Hunterian professor of the Royal College of Surgeons, and was appointed adviser on eyesight to the Board of Trade. His principal works are *Colour Blindness and Colour Perception*, 1891; *Memory and its Cultivation*, 1897; and *The Hunterian Lectures on Colour Vision and Colour Blindness*, 1911.

**Edrisi Mohammed** OR IBN MOHAMMED EL EDRISI (1100). Arabian geographer. A descendant of Mahomet, he was born at Ceuta, Morocco. Educated at Cordova, he early became a traveller, journeying in Spain, Barbary, Asia Minor, Greece, and Italy before he settled down in Sicily. At the desire of Roger II of Sicily he made a silver globe, upon which he mapped the world, and wrote in explanation *A Description of the World*, sometimes known as *The Book of Roger*. This was completed in 1154, and is the chief geographical work of the Middle Ages. There is an imperfect French translation (1836–40) by A. Jaubert.

American colloquial term "raise," have this underlying meaning.

Education as such has to do with the proper upbringing of children, the training of their mental and physical powers, the formation, moulding, and direction of their character. But since the instrument used in our schools to accomplish this purpose is knowledge, there has arisen a not unnatural impression that education consists in the imparting of knowledge. Schools have come to be regarded as information-shops, and teachers have taken rank as knowledge-mongers.

In the public schools of England this prominent position has not been assigned to knowledge; indeed, the tendency has been rather in the opposite direction; too little attention has been paid to actual instruction. Critics maintain that in the public schools in the past the pupils have been actually discouraged from taking or

showing any interest in things intellectual. On the other hand, it is generally admitted that nowhere has the training of character been more successfully carried on than in these schools. This was well recognized even before the Great War. The avowed aim of the English public schoolmaster is to turn out gentlemen, and the instrument hitherto used in the process has not been so much knowledge as games. An excessive use was perhaps made of this instrument, but the schoolmaster succeeded in accomplishing his aim. It is thought, however, that the schoolmaster could combine the excellences of his method of character training with a much greater amount of actual instruction in more or less useful subjects. The introduction of this term *useful* raises a problem.

#### Education and Utility

Universities and secondary schools have been long dominated by the concept of what is called a liberal education, by which is meant an education suitable for a free man: an education that will make him as nearly as possible a perfect human being as such, apart from any consideration of work or vocation. Thus one of the essential qualities of a liberal education is freedom from any taint of the useful in the ordinary meaning of that term. The pupil shall develop fully and freely all his qualities as a human being, irrespective of any use to which these qualities may be put. Some have gone the length of advocating the cult of the useless as something in itself desirable, but the more usual attitude is that the truly educated man is one who has been trained in subjects that are not required in earning a living, and that are not to be put to any use leading to material advantage.

Along with this more or less avowed cult of the useless, there grew up a theory that did something to save the conscience of practical English people. It was admitted that, as artisans and other humble folk had to be specifically prepared for the particular line of work that was to be their portion, so it was desirable that even those who would be called upon to sit in the seats of the mighty should get some sort of training that would have the direct result of fitting them to discharge their duties efficiently. Princes have quite a specific training, and certain other high dignitaries have an equally satisfactory preparation for their life work. The lure of the liberal arts was, however, very strong, and the fortunate free men of the world were willing

that the education of their children should be marked off from that of the unfree and artisan class.

A justification of this purely general and unspecific training was found in the theory that the subject studied did not in itself matter; that the training acquired in the process of mastering it did. The mind could be trained apart altogether from the nature of the material upon which it was exercised. The student of classics and mathematics learned not only to be a mathematician and a classical scholar, but to be a well-trained man in general. His mind was trained as mind, and was ready to be applied to any subject.

This is the much debated doctrine of formal training, according to which a man who has been trained in any subject can carry over the results of that training to any other subject; so that, for example, a man who has been trained in physics and mathematics may at once turn his training to account in governing a district in India.

#### Culture and Vocation

The cultural ideal stands at the one extreme, the vocational at the other. Those who believe in specific education hold that pupils should be prepared definitely for the particular line of life they are to follow. Naturally certain difficulties arise at once. To begin with, it is impossible to tell at an early age what the vocation of a particular pupil is to be. In olden times, when a man was practically born into a particular vocation, all went well. But in these days of wide opportunity the pupil must be left unfettered as long as possible so that his bent and capacities may be discovered. Indeed, one of the main problems of education in the future will be this determination of the possibilities of each individual pupil. The educator will be called upon, not merely to train for a particular kind of work, but to discover what the kind of work ought to be in each case. This will imply division of labour, and there will be cooperation between those who test capacity and those who develop it. Everything is therefore in favour of a gradual narrowing of the curriculum as the pupils advance in school, determined by the development of capacity and bent.

Vocational education must not be understood to apply only to the preparation of artisans. On account of confusion under this head the Workers' Educational Association is suspicious of vocational education, for it fears that the employing classes are anxious to get workmen broken in to their life's occupation as soon as possible, and thus to

turn them into specially efficient cogs in the industrial machine. There are, however, other than economic reasons for postponing as long as possible the decision of a pupil's ultimate vocation. A large part of the preliminary stage of education must be the same for all. Reading, writing, elementary arithmetic, and rudimentary drawing are of this kind, and have to be learned by all, irrespective of the use to which they have afterwards to be put. Certain other subjects are of value to all, no matter what their social position afterwards may be. Geography, history, literature, music, art, and general science belong to this group. By the time these subjects have been studied for some years the teachers will be able to determine the ability and the bent of the different pupils, and to advise them with regard to their further studies.

Every child is assumed to have a right to claim from the state an education suitable to his capacity, and without reference to his social rank. Has the state a corresponding right to educate its citizens: is the right to claim an education paralleled by a right to impose one? The remark comes down to us from classical times that statesmanship is "architectonic to education," in simpler language, that the educator has to take his orders from the statesman, because the statesman uses the human material prepared by the educator. In actual practice this principle is now generally recognized. No doubt in the past the influence of the state in education was largely negative; certain sections of the community were denied the privileges of education, and the segregation of ranks was so secured.

#### Education and Politics

But in modern times the state exercises the right of modifying the education of its citizens to suit its own ends. Germany is the conspicuous example of this attitude. In 1806, after Jena, Prussia was deprived by Napoleon of every chance of self-government—except in education. But the Prussians under the leadership of Fichte, von Humboldt, and others, deliberately set about regenerating their nation by means of education. As a result, Bismarck was able to say that it was the schoolmaster who conquered at Sadowa and afterwards at Gravelotte. Though used for a bad purpose, German education was no less powerful in moulding national character and opinion from 1871 to 1914. Japan offers an equally striking, but more pleasing, example of the power of national education when deliber-



ately applied to political ends. The rulers there determined to westernise the country, and by intelligent and purposeful manipulation of the educational system accomplished their end in a single generation.

As was to be expected from the English spirit, education has not developed in this way in Great Britain. Many attempts have been made to dominate education for sectional ends, mainly religious, but the spirit of compromise won at last, and the existence of the conscience clause which provides that no pupil shall be taught religious doctrines to which his parents object, or suffer because he is withdrawn from such instruction, is a clear proof that even ecclesiastical zeal has not been able to obtain complete control of the schools.

#### Schools and Propaganda

It would be impossible to use the English schools after the German fashion for purposes of propaganda in the interests of a ruling class. Hitherto the main demand for propagandist opportunities has come from honest enthusiasts who have some social panacea, and know that an entry into the schools is the best way possible of bringing influence to bear in favour of their nostrums. Prohibitionists, esperantists, advocates of the metric system, anti-vaccinators, anti-vivisectionists, and other particular theorists have sought to gain admission to the schools. No doubt with increasing intercommunication between the home and the school there will in the future be a wider use of educational organization for purposes of social and ethical propaganda, but no propaganda will be tolerated that does not command very wide popular support.

Many people, however, regard with uneasiness the growing centralisation of the educational administration of England. The intense individualism of the Englishman makes him inclined to resent any interference with what he regards as peculiarly his own, and under this head his children hold a prominent place. The nation, however, has got beyond the stage at which one is inclined to claim that, with regard to the education of one's children, one ought to be allowed "to do what one will with one's own." It has learnt that for the best working of national education there must be a certain amount of central control. But English people seem to want this control kept within narrow limits. They have watched with uneasiness the history of state interference in education.

Since the first government grant in 1833 the state has been gradually gathering under its control the educational system. At first it confined its authority to the elementary schools, but by the power of the purse it has been able to bring the secondary schools more and more under its control, and now by an extension of the grant system the universities themselves are coming within the range of state authority. There has not, however, been any attempt to influence unduly the schools, the colleges, or the universities of the country. Indeed, the Board of Education is showing itself particularly anxious that the local authorities should share the burden of administration, and recent changes in the distribution of financial burdens between central and local authorities make it much easier for central and local authorities to work harmoniously together.

In England the educational expert and the educational administrator have in the past been brought far too little together. The Education Act of 1918 marks an important advance in this matter. For the first time there was a minister of education who was really in intelligent sympathy with educational principles and methods, and the Act benefits accordingly. It has the great merit of making provision for the adolescent period, the period of most importance in the development of the individual, but a period that had not been specially considered in previous educational legislation. In this and in other points the Act recognizes fully the need to take account of the results of those who are engaged in educational research.

#### Progress of Scientific Method

Hitherto education has been carried on on a basis of generalised opinion rather than of established principles. Not merely administrators but professional teachers themselves have been content to accept traditional opinions and methods. There has been no satisfactory means of comparing the advantages of the different educational schemes suggested from time to time. In short, there has been no science of education. Whether such a science can ever be developed is a point in dispute.

Although it can never become an exact science, education is becoming more scientific in its methods. It is perhaps impossible ever to establish a real objective standard in education that might do something like what the thermometer or the barometer does for other sciences; but we are on the way towards it. Statistical

and experimental methods are being widely developed in education, and educational results now published are no longer mere subjects of logical debate, but are at once tested by repeating the experiments or observations on which they are based.

In this sifting process much help may be looked for from the scientific methods used by Prof. Karl Pearson, Prof. Spearman, and others. Although the results of these mathematical investigations may be over-valued, there can be no doubt that they provide an instrument that will be of the first importance in making real educational progress possible.

#### Development of Child-Study

A contrast to this over-exactness of mathematical formulae is provided by what is called child-study; with the result that we have a very happy combination of the abstract and the concrete. Such investigations as Prof. Binet carried on to determine scales of intelligence are examples of child-study scientifically conducted. The correlation of bodily with mental age is a helpful concept, and promises to be of great value. It provides what is practically an objective standard in determining the normal, the sub-normal, and the supernormal child. The nature of the defective child is becoming much clearer, thanks to the tests developed from the Binet scheme. The treatment of supernormal children is only now receiving serious attention from educational authorities, and a profound modification of class organization is likely to follow. At this point the social changes coming into educational organization call for mention. The correlation of scientific testing of individual pupils with the social school organization implicit in such a scheme as is worked out at Gary, in Indiana, cannot but lead to fundamental changes. We are indeed on the brink of a real, but not a sudden, revolution in education.

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**Education, BOARD OF.** Body established in 1899 to supervise public education in England and Wales. Its head, the president, is a party politician, usually a member of the Cabinet, and receives a salary of £2,000 a year. He is assisted by a parliamentary secretary and a permanent secretary, under whom are a large staff of inspectors and other officials, and also by a consultative committee. The chief departments of the Board are concerned with elementary education, secondary education, technical education, and training colleges. The Board looks after the Science Museum at South Kensington and the Geological Survey and Museum.

Before the establishment of this Board education in England and Wales was controlled by a committee of the privy council, first appointed for this purpose in 1839. The lord president of the council was the head of this, but the real minister of education was the vice-president, also a politician. In Scotland education is looked after by an education department under the general control of the secretary for Scotland; in Ireland the work is done by the national education board as regards elementary, and the intermediate education board as regards secondary education. In Canada, Australia, and also in the various states and provinces therein, there is a department of education presided over by a minister, as there is in many foreign countries.

**Education Acts.** Series of Acts dealing with education in England and Wales from 1870 onwards. The principal of these were the Elementary Education Act of 1870, which instituted a state system of compulsory education, side by side with the voluntary schools, and initiated the long controversy on the subject of religious instruction: the Act of 1891, which reduced or abolished school-fees: the Act of 1902, by which an education rate was levied in respect of all schools, both state and voluntary: and the Act of 1918, which dealt comprehensively with the whole question of educa-

tion, raising the school age, and providing free and compulsory instruction for young persons up to the age of 18 by means of continuation schools. See Continuation Schools; Education; Evening Schools.

**Edward, LAKE,** formerly Albert Edward Nyanza. Lake of East Central Africa, 150 m. W. of the Victoria Nyanza. Lying at an alt. of 3,000 ft. above sea level, it is connected on the N.E. by a tortuous channel with Lake George. The latter was discovered by H. M. Stanley in 1875, who believed it to form part of the Albert Nyanza; but, while tracing the source of the Semliki river in 1889, he discovered the lake he named Albert Edward Nyanza, and also the channel connecting it with Lake George. The length of Edward Lake is 44 m. and the breadth 33 m.

**Edward.** Masculine Christian name. Of Teutonic origin, it means able to guard. It was very popular among the Anglo-Saxons, being borne by Edward the Elder, Edward the Confessor, and other kings, and has since been one of the most used of English names. The Anglo-Saxon Edward is sometimes spelled Eadward, a form which gives the best idea of the diphthong with which it began in that tongue. Eadward, Edoard, and Edoardo are the German, French, and Italian forms. Edward is the form used throughout this Encyclopedia.

**Edward, CALLED THE ELDER** (d. 924). King of the English. The son of Alfred the Great, he fought against the Danes and was called king before his father's death. In Nov., 901, the witan chose him as Alfred's successor. His succession was disputed by his cousin Ethelwald, who rebelled and was slain in battle in 905. By 918 Edward brought the Danes into subjection; in 919, on the death of his sister Ethelfleda, he absorbed Mercia; and in 921 he subdued the Welsh. He ruled as far north as the Humber, and his overlordship was acknowledged by all the other kings. The "unconquered king," as Florence of Worcester calls him, died at Farndon, Northamptonshire, and was buried at Winchester. He left a large family, including his successor Athelstan, and daughters who married Hugh, count of Paris, and the emperor Otto the Great.

**Edward, CALLED THE MARTYR** (c. 963-978). King of the English. The son of Edgar, his right to the succession was disputed on Edgar's death in 975 by his stepmother Elfrida, who put forward her son Ethelred (the Unready). Edward was supported by Archbishop Dunstan, and was crowned. On Mar. 18, 978, he was assassinated by

Elfrida's orders, while being offered a drinking-cup, and was hastily buried at Wareham. In 980 his body was transferred to Shaftesbury, and his tomb became a place of pilgrimage. He was long revered as saint and martyr, his festival being kept on March 18.

**Edward, CALLED THE CONFESSOR** (c. 1005-66). King of the English. The son of Ethelred the Unready



Great Seal of Edward the Confessor

and Emma, daughter of Richard, duke of the Normans, he was born at Islip, Oxfordshire. He was taken to Normandy by his parents when Sweyn became king in 1013. Invited to England in 1041 by his half-brother, Hardicanute, when the latter died in the following year Edward was chosen king, and placed on the throne largely by the help of Earl Godwin, whose daughter Edith he married in 1045.

His reign was peaceful, though marked by struggles for power between the English and the Normans, the latter being befriended by the king. Edward's chief interest was religion, and he devoted a large part of his revenues to the erection of Westminster Abbey. It was consecrated at the end of 1065, and Edward died Jan. 5, 1066. He was canonised in 1161, and his festival is kept on Oct. 13. See Lives of Edward the Confessor, ed. H. R. Luard, Rolls Series, 1858.

**Edward I** (1239-1307). King of England. The eldest son of Henry III, he was born at Westminster,



Edward I,  
King of England,  
1272-1307

June 17, 1239. In the differences between the crown and the baronage, Edward sided with his father, and was taken prisoner after the battle of Lewes, 1264. He escaped, however, and directed the royalist victory over Simon de Montfort at Evesham in 1265. He succeeded to the throne

in 1272. During his reign, Edward conquered Wales, and endeavoured to form a united kingdom embracing the whole island by asserting his sovereignty over Scotland, which regularly rebelled whenever the king was seriously engaged elsewhere. Edward was at the head of an invading army when he died, July 7, 1307, at Burgh-on-Sands.

Edward ranks as one of the greatest kings of England. He systematised the English laws, and gave the English parliamentary system its definite form by summoning to the Model parliament of 1295 not only the higher clergy and baronage, but knights and burghers. His tomb in Westminster Abbey bears the inscription, *Malleus Scotorum*, "the Hammer of the Scots," and his motto, *Pactum serva*, Keep troth. Edward's first wife was Eleanor, daughter of the king of Castile, and his second wife was Margaret, daughter of Philip of France. \* See Edward I. T. F. Tout, 1893 : also *ill.* p. 2240.

**Edward II** (1284-1327). King of England. Son of Edward I, he was born at Carnarvon, April 25, 1284. In 1301 he was created prince of Wales at Lincoln and he acted as regent when his father



Edward II,  
King of England,  
1307-27

king. He abandoned the war against Scotland, and was married to Isabella of France.

Edward was already under the influence of Piers Gaveston. The barons took up arms with Edward's cousin, earl Thomas of Lancaster, at their head, and they forced upon the king the banishment of Gaveston. A reconciliation, brief and insincere, followed. In 1314 the Scotch war was renewed and Edward suffered defeat at Bannockburn. This was Lancaster's opportunity, and for a time the king was a cipher, but he found fresh favourites in the Despencers, and a combination of circumstances brought about the defeat and death of earl Thomas in 1322. Edward and the Despencers were then supreme until 1326. Isabella, alienated from her husband, crossed from France with some followers. Caught in Wales, he was formally deposed, and on Sept. 21, 1327, he was murdered at Berkeley Castle.

*See Place and Reign of Edward II in English History, T. F. Tout, 1914; also illus. pp. 1077 and 1713.*

**Edward III** (1312-77). King of England. Born Nov. 13, 1312.

he was raised to the throne by the deposition of his father, Edward II (Jan., 1327). The government was in the hands of the queen - mother Isabella and Roger Mortimer till the young king, who married Philippa of Hainault, 1328, overthrew them by a *coup d'état* in 1330.

At first Edward warred against the Scots, but his ambitions were soon turned to France, and in 1338 began the Hundred Years' War. In the course of it he secured the English supremacy of the narrow seas by the naval victory of Sluys, June 24, 1340, established the prestige of the English soldiery and the military supremacy of the English archers by the startling victory of Crécy, Aug. 26, 1346; and in 1347 captured Calais. A victory was won by his son Edward the Black Prince at Poitiers, Sept. 19, 1356, and Edward was confirmed in the independent sovereignty of Aquitaine by the treaty of Brétigny in 1360. He died, prematurely senile, June 21, 1377. His family included the dukes of Clarence, York and Lancaster, whose descendants fought for the crown during the Wars of the Roses. He was the first king who conspicuously directed policy to commercial expansion, the security of the trade with Flanders being one of the objects of his French wars. See Lives, W. Longman, 1869; W. Warburton, 2nd ed. 1876; J. Mackinnon, 1900.

**Edward IV** (1442-83). King of England. The eldest son of Richard duke of York, and Cicely Neville.



he was born at Rouen, April 28, 1442. In Dec., 1460, he became the leader of the Yorkists and their candidate for the crown. Acting with great energy, he crushed the Lancastrians at Mortimer's Cross, and in London was hailed as king. He then seated himself on the throne at Westminster on March 4, 1461.



Edward III,  
King of England,  
1327-77

After a victory at Towton Edward was able to hold his own, although not absolutely secure. In 1469, however, came a change. He had made many enemies by the favour he showed to his wife's kinsfolk, the Woodvilles, and when Warwick and Clarence, the king's brother, joined his foes, his position was precarious. He prepared to meet them in the field, but the desertion of 6,000 men was fatal to his cause, and in great haste he left Lynn for the Netherlands. Returning with an army, he won battles at Barnet and Tewkesbury. In 1475 he conducted a short war with France and he had some trouble with Scotland, but in general he kept the land at peace. He died April 9, 1483. See *Life*, L. Stratford, 1910; also *illus.* p. 1802.

**Edward V** (1470-83). King of England. He was born in the Sanctuary, Westminster, Nov. 3, 1470, a son of Edward IV and Elizabeth Woodville. When he succeeded to the throne, April 9, 1483, his uncle, the duke of Gloucester, was his guardian.

Gloucester, however, imprisoned the boy king and his brother in the Tower, and had himself crowned as Richard III, July 6, 1483. According to Sir Thomas More, endorsing contemporary belief, Edward and his brother were murdered very shortly after. See Richard III.

**Edward VI** (1537-53). King of England. He was born at Hampton Court, Oct. 12, 1537, the son of Henry VIII and his third wife, Jane Seymour, and succeeded to the throne, Jan. 28, 1547. His uncle, the duke of Somerset, was protector and the real ruler for the first half of

the reign, and on Somerset's fall and execution, to which the young king calmly assented, his rival, the earl of Warwick, later duke of Northumberland, held the chief power. The young king favoured Northumberland's plan for securing the succession of his daughter, Lady Jane Grey. Edward died at Greenwich, July 6, 1553. See King Edward VI: an appreciation, C. R. Markham, 1907.



Edmund



Arthur L. F.

## EDWARD VII: KING AND PEACEMAKER

J. G. J. Penderel-Brodhurst, Author, *The Life and Times of Edward VII*

*As in the case of other kings of England, an article is devoted to the life and work of this monarch. For the history of his time see Europe; France; United Kingdom, etc. See also Victoria*

Albert Edward, the second child and eldest son of Queen Victoria and Prince Albert of Saxe-Coburg, was born at Buckingham Palace, Nov. 9, 1841. He was educated upon pedantic and rigid lines, which made his boyhood a weariness and his adolescence a struggle for emancipation. His day was carefully mapped out; every hour had its allotted subject, and light reading was frowned upon; he was kept in on every side by governors and tutors, and allowed to associate intimately only with youths of his own age, carefully chosen for their high qualities. This method excluded much of the human side of life, and left little room for the escape of the high animal spirits which Edward VII possessed almost to the last. He studied science at Edinburgh, and went up successively to Christ Church, Oxford, and Trinity, Cambridge, but took no degrees. The wisest part of his education consisted of travel, and the Prince Consort exhibited admirable foresight when, in 1860, he arranged a long tour for his son in Canada and the U.S.A. At the end of 1861 Prince Albert died, and immediately afterwards his son paid a visit to the Holy Land.

In 1863 he married Princess Alexandra, daughter of Prince Christian of Glücksburg, who shortly afterwards became king of Denmark. Good-looking, good-humoured, frank and open, with an untiring zest for life, of cosmopolitan tastes, yet an Englishman to the core, his marriage greatly increased the popularity which he had always enjoyed. For very many years he performed with tact and assiduity the representative functions which Queen Victoria felt herself unable to face. The more tedious duties of royal personages in a democratic monarchy are hardly a training for statesmanship, but they bring a prince into contact with the people, and provide him with the means of becoming acquainted with every corner of his country and with many social grades.

King Edward made the best of such opportunities. He had an inexhaustible interest in men. They were the books from which he learned, and as time went on his knowledge of social and political movements became extensive. He knew all the distinguished men in Europe, and gradually developed a keen and sane interest in affairs,

and especially in foreign politics. Yet his political knowledge was acquired externally and by intercourse with politicians. Not until he was turned fifty was Queen Victoria's assent obtained to his receiving copies of important dispatches. Foreign politics fascinated him, and from middle life to the close of his short but brilliant reign he was profoundly interested in the external relations of the Empire.

Side by side with this absorbing interest he developed keen sympathy with social reform. He was a member of a royal commission on the housing of the poor; to him the London hospitals owe in large measure the present living interest in their work. His solicitude for the alleviation of pain

and sickness was to some extent the outcome of his own grave illness from typhoid in 1871, when he was saved from death only by the most skilful nursing and a robust constitution. It was the social and charitable side of freemasonry which made him an enthusiast for "the Craft," and brought him to the English grand mastership.

As heir to the throne the prince necessarily sat upon the cross-benches of the House of Lords. Both as prince of Wales and as king he was a great traveller, and in 1875 he paid a memorable visit to India which laid the foundations of the more modern relations of that empire with the mother-country. Yet, despite the popularity won by his unflinching tact, inherent dignity, and careful attention to the duties which fell upon him, or which he made for himself, he was not exempt from criticism. There were those to whom his love of the turf—he



From the portrait by Harold Speed.  
By permission of the Fine Arts Publishing Co.

*Edward VII*



Edward VII. 1. Aged eleven, from a painting by Winterhalter. 2. A photograph at the age of 21. 3. Edward and Alexandra on the eve of their wedding, from a drawing. 4. King Edward in his study. 5. As Admiral of the Fleet. 6. As Field-marshal. 7. In his coronation robes

Photos: 4 and 5, Russell; 6, Lafayette; 7, Downey

won the Derby thrice—was an offence, and others who blamed him for what appeared to be an undue tendency to select his friends from among those who shunned the sterner walks of life. These feelings were expressed by the country generally when, in 1891, a famous lawsuit followed a scandal at cards on an occasion when the prince of Wales was banker. Little more than six months later—in January, 1892—the prince's eldest son, the duke of Clarence, who had just been betrothed to his cousin, Princess Victoria Mary of Teck, died, and all was forgotten in sympathy with so tragic a grief. This sorrow did much to draw prince and people more closely together, and when, on January 22, 1901, he ascended the throne, affectionate regard was merged in ready and loyal homage.

Edward became king in his sixtieth year. With much intuition, a quick and flexible mind readily open to new impressions, and a clear appreciation of the functions of a limited monarch, he associated much of the tenacity of his family with an extraordinary knowledge of men and affairs and unfailing industry.

King Edward's aptitude for kingcraft now began to enjoy the scope it had hitherto lacked, and in the spring of 1903 he paid a series of visits devoted to strengthening the bonds of friendship between Great Britain, France, Italy, and Portugal. Three visits with a similar object were paid to Ireland, and later he went twice to Germany, where the ex-Kaiser bore public testimony to his uncle's "unremitting endeavours" in the cause of peace. It is an open secret

that his diplomacy averted war between Sweden and Norway in 1905 when the two countries dissolved partnership, and the consolidation of a good understanding with Russia owed much to his personal efforts. It has been hotly denied that he had any influence whatever in bringing about the *entente* with France. It is nevertheless idle to suppose that his friendship with French presidents and politicians, and his own frank delight in France and appreciation of the French character, can have counted for nothing.

King Edward's death came in the midst of the heavy political anxieties attendant upon the sharp conflict between the two houses which issued in the Parliament Act. He fell quickly before an attack of bronchitis, and died May 6, 1910; he had reigned for a



little more than nine years. He had five children who survived infancy: the duke of Clarence, who predeceased him, King George V, the princess royal, princess Victoria, and the queen of Norway.

*Bibliography.* Life, 5 vols., J. P. Brodhurst, 1905-11; Edward the Peacemaker, W. H. Wilkins, 1910-11; King Edward VII as a Sportsman, A. E. T. Watson, 1911; King Edward in his True Colours, E. Legge, 1912; More About King Edward, E. Legge, 1913; The Influence of King Edward, Viscount Esher, 1915.

**Edward** (b. 1894). Prince of Wales. The eldest son of King George V and Queen Mary, he was born at White Lodge, Richmond, June 23, 1894, and christened, on July 16, Edward Albert Christian George Andrew Patrick David.

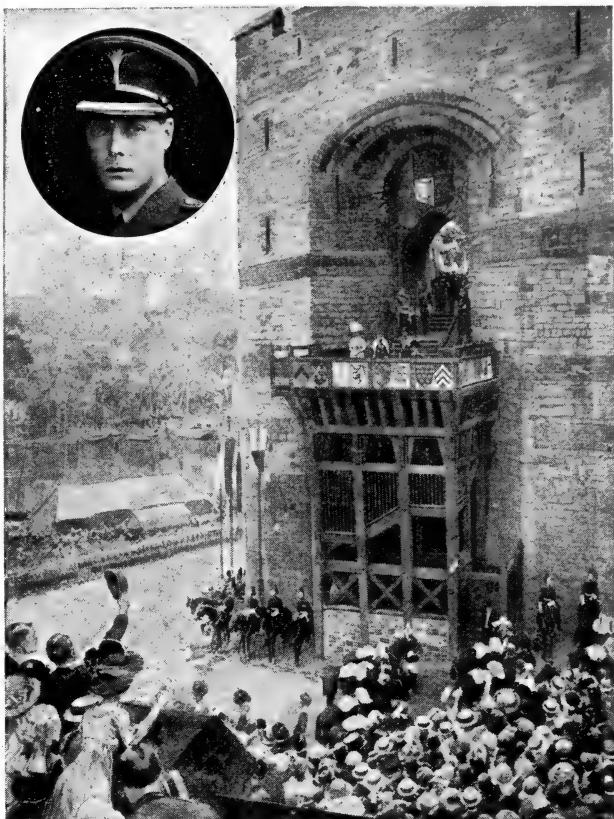
In 1907 the prince entered the Royal Naval College, Osborne, for two years' training, going next to Dartmouth. He was created prince

*Edward VII*

of Wales, June 23, 1910. His investiture as prince of Wales, at Carnarvon, was notable because he was the first of nineteen princes of Wales to be invested in Wales itself. As midshipman he sailed on H.M.S. Hindustan, where he proved himself a thoroughly hard worker. The prince's first public ceremony was at the presentation of a silver oar to Dartmouth, in March, 1911; he was invested Knight of the Order of the Garter, June 10, 1911, and a few days afterwards took a leading part in the coronation of his parents. In 1912, being eighteen, he celebrated his majority. In 1913 he entered Magdalen College, Oxford, after a visit to Paris, where he received the Legion of Honour.

When the Great War broke out in August, 1914, he made an appeal for the national fund to allay distress, and millions of pounds were subscribed. He was gazetted, Nov. 17, 1914, as aide-de-camp to the commander-in-chief of the Expeditionary Forces, and went to France. He was attached in turn to army corps, divisional and brigade headquarters, and was frequently under fire. He carried the dispatch concerning the battle of Neuve Chapelle on his brief leave in April, 1915.

His 21st birthday passed without public celebration, by his wish, but a separate establishment was provided for him in St. James's Palace. He served in Egypt in 1916, as captain on the general staff, and visited the Italian front at a time of crisis. During short



Edward, Prince of Wales. Scene after the investiture at Carnarvon Castle, July 13, 1911. The Prince is standing between King George and Queen Mary on a platform at the top of specially constructed steps at the gate where, according to tradition, the first infant prince of Wales was presented by Edward I to the Welsh chiefs. Inset: His Royal Highness as Colonel of the Welsh Guards (photo Vandyk)

leave, the prince took his seat in the House of Lords, Feb., 1918, being promoted major in the same month. After the armistice he undertook many public duties; and took up the freedom of the City of London, May, 1919. He toured through Canada and the U.S.A., August-December, 1919, visited Fiji, New Zealand, and Australia in 1920, and made a tour of the Indian Empire in 1921-22. Possessed of a simple directness of speech, combined with geniality and tact, the prince discharged his varied duties with success.

David Williamson

**Edward** (1330-76), known as the Black Prince. Eldest son of Edward III of England, he was born at Woodstock, June 15, 1330; in 1333 was made earl of Chester, four years later duke of Cornwall, and in 1343 prince of Wales. In 1345 he accompanied his father on the French campaign and dis-

tinguished himself at the battle of Crécy. Two years later he was at the capture of Calais, and in 1350 he was in the sea fight off Winchelsea against the Spaniards. In 1355 Edward was sent to Gascony, when he led the English armies in a series of raids over the French territory. In the following year a similar expedition culminated in the battle of Poitiers (*q.v.*).

In 1357 he returned to England and in 1361 married his cousin Joan, known as the Fair Maid of Kent. In 1362 his father granted him Gascony and Aquitaine. He took part in a disastrous expedition for replacing Peter of Castile on the throne, but soon many disaffected lords of his territories rose against him, and many of his towns surrendered to them. When, after a month's siege, he re-took Limoges, he ordered a general massacre of its inhabitants. In 1371 Edward returned, in broken

health, to England. He supported the bishops against the evil administration of Lancaster. He died at Westminster on July 8, 1376, and was buried in Canterbury Cathedral. He was not called the Black Prince until long after his death, the name being probably given him because he wore black armour. His son was Richard II. See Lives, G. P. R. James, 2nd ed. 1839; R. P. Dunn-Pattison, 1910.

**Edward, THOMAS** (1814-86)-Scottish naturalist. He was born Dec. 25, 1814, at Gosport, where his father, a private soldier, was on service. He was taken by his parents to Banff at an early age, and remained there for the rest of his life. From childhood he displayed a great love for natural history. A poor shoemaker, he for many years spent the whole of his nights out of doors. He discovered between twenty and thirty species new to science, in addition to adding to the British fauna a vast number of species hitherto unknown in these islands. In 1866 he was elected an associate of the Linnean Society, and a civil list pension was awarded to him. He died April 27, 1886. See Life of a Scotch Naturalist, S. Smiles, 1876.

**Edwardes, GEORGE** (1852-1915). British theatrical manager. He was born Oct. 8, 1852, of Irish parents, and started his career as business manager at the Gaiety Theatre, Dublin. In 1875 he became business manager for D'Oyly Carte at the Opéra Comique, London, and went with him to the Savoy. He joined John Hollingshead as joint manager at The Gaiety, London, Dec., 1885, and in 1886 became the manager of that theatre, which he directed for nearly thirty years, producing a long series of successful musical plays. He died Oct. 4, 1915.

**Edwardes, SIR HERBERT BENJAMIN** (1819-68). British soldier and Indian administrator. He was born at Frodesley, Shropshire, Nov. 12, 1819, and became a cadet in the East India Company in 1840. In 1845-46 he was aide-de-camp to Sir Hugh Gough in the Punjab campaign. As first assistant to Sir Henry Lawrence, the resident at Lahore, he administered Bannu, and his courage and resourcefulness were conspicuously seen in his defeat of the diwan of Multan, 1848. Edwardes rendered signal service during the Mutiny by securing the neutrality of Afghanistan. Knighted in 1860, he returned to England in 1865, and died Dec. 23, 1868. See Memorials of Life and Letters, E. Edwardes, 1886.

**Edwardesabad.** Alternative name given to the town of Bannu (q.v.), N.W. Frontier Prov., India.

**Edward Medal.** Medal instituted in 1907 by Edward VII to reward heroic acts in civil life, es-



Edward Medal, instituted as a reward for heroic deeds in civil life (reduced)

pecially in mines and quarries. It consists of two classes, the Edward medal, and the Edward medal in silver. Bars are awarded for further conspicuous acts of bravery. The medal bears a portrait of King Edward. The ribbon, which is worn in a bow by women, is dark blue with narrow yellow edge.

**Edwards, ALFRED GEORGE** (b. 1848). British prelate, the first Anglican archbishop of Wales.



Alfred G. Edwards, Archbishop of Wales  
Russell

Born Nov. 2, 1848, he was educated at Jesus College, Oxford, and, having been ordained, became in 1875 headmaster of Llandoverly College. In 1885 he was made vicar and rural dean of Carmarthen, and in 1889 was consecrated bishop of St. Asaph. In April, 1920, Dr. Edwards was elected the first archbishop of the new province of Wales. See Wales, Church of.

**Edwards, AMELIA BLANDFORD** (1831-92). British novelist and Egyptologist. She was born in London, June 7, 1831, and for many years wrote stories for Household Words and All the Year Round, besides contributing articles to The Saturday Review and The Morning Post. Barbara's History, 1864, was translated into German, Italian, and French; and Lord Brackenbury, 1880, ran into 15 editions. In 1882 she founded the Egypt Exploration Fund, and the rest of her life was devoted to that object. She endowed the first Chair of Egyptology at London University. She died April 15, 1892.



Amelia B. Edwards, British novelist

**Edwards, JOHN PASSMORE** (1823-1911). British journalist and philanthropist. Born at Black-

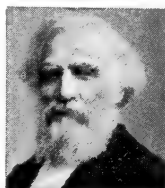
water, Cornwall, on March 24, 1823, the son of a carpenter, he trained himself to be a journalist,

coming to London in 1846. He was proprietor and director of the London evening journal The Echo, 1876-96, and sat as Liberal M.P. for Salisbury, 1880-85. Active in political and social reform, he is chiefly remembered for his benefactions to hospitals, libraries, art galleries, and other public institutions, of which he founded more than 70 of various kinds. He died April 22, 1911. See Echo; Passmore Edwards Settlement; consult also the autobiographical A Few Footprints, 2nd ed. 1906.

**Edwards, JONATHAN** (1703-58).

American divine and metaphysician. He was born Oct. 5, 1703, at East Windsor, Connecticut, and in 1727 became minister at Northampton, Massachusetts. His extreme and logical Calvinism was expounded with unusual power, but his insistence on church discipline brought dismissal from the pulpit. From 1750-58 he resided at Stockbridge as a missionary to the River Indians, and a few weeks before his death, March 22, 1758, he was appointed president of Princeton College, New Jersey. Edwards was the author of many books, of which the most important was A careful and strict Enquiry into . . . Freedom of Will, 1754. Works, ed. with Memoir, S. E. Dwight, 10 vols., 1830. See Calvinism; consult also Life, A. V. G. Allen, 1889.

**Edwin or EADWINE** (c. 585-633). King of Northumbria. The son of Ella, king of Deira, he was driven from Deira after his father's death by the king of Bernicia, and took refuge with Raedwald, king of E. Anglia, who defeated and slew the Bernician king in 617. Edwin then annexed Bernicia and became king of Northumbria. In 625 he married Ethelberg, sister of the king of Kent, and in 627 was baptized by Paulinus and his kingdom became Christian. Edwin's overlordship extended over all Anglo-Saxon Britain except Kent,



J. Passmore Edwards, British philanthropist  
Elliott & Fry



Jonathan Edwards, American divine

and his rule was notable for its justice and peace. On Oct. 12, 633, Edwin was defeated and slain at Hatfield, Yorkshire, in a battle against a coalition of heathens under Penda of Mercia and Cadwallon of North Wales. Edinburgh, which he fortified, is named after him, and he was long venerated as a saint.

**Edwin and Angelina.** Simple ballad, sometimes called *The Hermit*, by Oliver Goldsmith. It was privately printed for the countess of Northumberland in 1765 and first published in *The Vicar of Wakefield* (1766), where it is introduced by way of contrast with the false taste and meretricious exuberance of language in the poetry of the time. It tells of the coming together of separated lovers; Angelina, disguised as a youth, seeks guidance from a hermit, only to find that he is her lost Edwin. From this sentimental ballad the names have come to be applied, rather derisively, to any loving young couple.

**Eeckhout,** GERBRAND VAN DEN (1621-74). Dutch painter. Born at Amsterdam, Aug. 19, 1621, he was the favourite pupil and later the friend of Rembrandt. He painted genre, portraits, and scriptural subjects, but his cabinet pictures are superior to those executed on a larger scale. Among his best works are *The Raising of Jairus's Daughter* (Berlin), *Tobit and the Angel* (Brunswick), *The Presentation of Jesus in the Temple* (Dresden), *Soldiers Gambling*, *Jesus Among the Doctors* (Munich), *Merrymaking in the Guard-house*, and the portraits of Oliver Dapper, the geographer, and Rembrandt. He also executed a number of etchings. Eeckhout died at Amsterdam, Sept. 29, 1674.

**Eecloo.** Town of Belgium, in the prov. of E. Flanders. It stands on the Liève, 11½ m. N.W. of Ghent. A rly. junction, it is connected also with neighbouring towns by tramways. It carries on a large trade in grain, and its manufactures include lace, woollen, and linen goods. Pop. 13,536.

**Eel** (*Anguillae*). Group of fishes with elongated snake-like bodies and no visible scales. They are found in both sea and fresh waters in most parts of the tropical and temperate regions of the world. The common European eel (*A. vulgaris*) is a familiar example of the class.

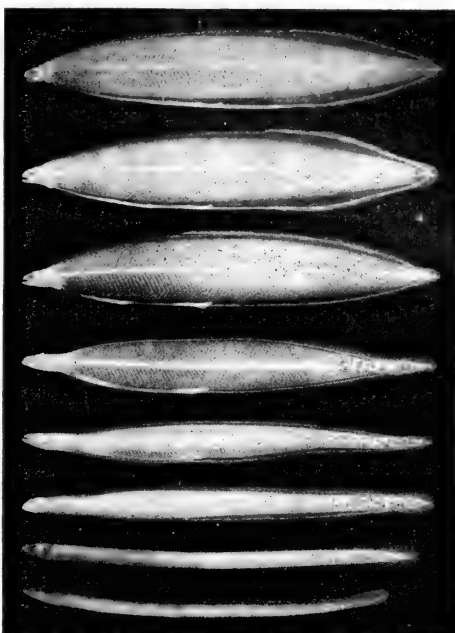
The life history of the eel, long a complete mystery, was worked out by the Italian zoologist, Battista Grassi (b. 1855). It is now known that the broad-nosed and sharp-nosed eels are not two varieties, but that the former is the male and

the latter the female. The male is rarely found except at the mouths of rivers and in brackish water, but the female is common in most rivers and ponds. In autumn the mature eels migratedown the rivers to the sea, and those in ponds will often go overland for considerable distances at night to reach the rivers.

Eels spawn in the sea during winter, apparently in deep water some hundreds of miles from land. The eggs hatch out as little fish known as *Leptocephali* or glass fishes, so entirely unlike their parents that they were formerly thought to be a distinct species. They are flat, ribbon-like creatures about 3 ins. long, curiously deep in body, scaleless and transparent, with small heads.

These *Leptocephali* do not appear to feed in the sea, and they gradually shrink both in length and depth, and become round in body, when they are known as glass eels. In this state they make their way up the rivers in such countless millions that the water is often black with them. In ponds eels often live for several years before descending to the sea to spawn, where it is supposed they die after depositing their eggs.

Eels are largely used as food by most European nations, and the British supply comes largely from Holland and Denmark. In Feb., 1919, the Fresh Water Fish Committee urged that steps should be taken for the cultivation of eels in



Eel. Stages in the metamorphosis of the common eel from the full-grown larval eel (*Leptocephalus*), which is 3 ins. long, thin, and transparent. In each successive stage the eel gets rounder, until it finally assumes the serpent form. The metamorphosis takes a year to complete, and during this time the eel does not feed

Great Britain on a large scale. Before the Great War the Germans had established a large eel-catching depot on the Severn, whence many millions were exported to Germany for cultivation there between 1908 and 1911. The committee recommended that an experimental eel-cultivating establishment should be inaugurated under government auspices, and that use be made of the German depot, which the ministry of agriculture and fisheries was endeavouring to acquire in 1920. See illus. p. 2205

**Eel, ELECTRIC** (*Gymnotus electricus*). Large eel-like fish found in the rivers of Brazil and Guiana. Though resembling an eel in general appearance, it is widely removed from it in internal structure. It attains a length of 6 ft., and is notable for the powerful electric shock that it can give. The electricity is generated by four organs lying in pairs under the skin, but their precise mode of action is not fully understood. The animal uses this power for killing or stunning the fish on which it feeds, as well as in self-defence. The force of the shock varies greatly, but is sometimes sufficiently strong to overpower a horse. See *Electric Fish*



Eel. The electric eel, a large South American fish which can impart a powerful electric shock

**Eel-grass** (*Valisneria spiralis*). Perennial aquatic herb of the natural order Hydrocharidaceae. It is a native of warm and temperate regions, including S. Europe. The short stem is immersed in the mud of rivers and lakes, and from it arises a tuft of thin grass-like leaves a yard long, but only  $\frac{1}{4}$  in. wide. The female flower has a very long spiral stalk which enables it to lie upon the surface of the water. The male flowers (produced by separate plants) have very short stalks which break away from their attachment, so that they float to the surface, where they pollinate the females. This accomplished, the female, by the spiral contraction of its stalk, is withdrawn to the bottom, where it develops into a cylindrical berry.



Eel-grass. Plants of the aquatic herb

**Eel Pie Island.** Islet in the Thames opposite York House, Twickenham. Also called Twickenham Eyot, it has long been noted as a favourite resort of anglers and boating parties. The inn on the islet occupies the place of Eel Pie House, pulled down in 1830.

**Eel Pout** (*Lota vulgaris*). Popular name for the burbot. It is a fresh-water fish, common in European and American rivers, but found in Great Britain chiefly in the Cam and the Ouse. It is about a yard long, and somewhat eel-like in shape.

**Effendi.** Turkish title of respect. It is applied in the East to government officials, men of learning, and others. It is a corruption of the Greek *authentēs* (mod. pron. *atthendēs*), a lord.

**Effervescence** (Lat. *effervesce*, to boil up). Name applied to the phenomenon of the rapid escape of gas from a liquid. It is usually the result of chemical action. A familiar example is seen in the mixing of a seidlitz powder with water. When soda water is withdrawn from a syphon the evolution of carbon dioxide is due to physical causes.

**Efficiency** (Lat. *efficientia*, a carrying out). Term meaning in general the quality of producing some desired result. Apart from its use in engineering, it is increasingly used in industrialism and economics, considerable attention being paid by doctors and others to the efficiency of the worker.

In engineering, efficiency is the ratio of the amount of energy given out from a conducting, converting, or transmitting device to

the energy received by it. In all cases the efficiency is less than unity, as some of the energy is dissipated or used up unprofitably. The efficiency of a joint is the ratio of the strength of the joint to a similar section of unjointed material. In aeronautics, where the main spars are spliced, the efficiency of the splice is its strength relative to that of the unspliced wood of similar section.

The heat-absorbing efficiency of a boiler is represented by the percentage of the heat units of the burnt fuel which is found in the water and steam. The efficiency in very good boilers may be as high as 80 p.c. The heat-converting efficiency of a steam engine is its capacity for converting units of heat energy into units of mechanical work on the basis of one thermal unit being equivalent to 778 foot-pounds of work. So much heat is wasted by conduction, condensation, etc., that the efficiency, even in the best engines, does not exceed 15 p.c. to 18 p.c. The brake or effective h.p. of an engine is less than the indicated h.p., owing to loss in overcoming friction. Similarly, the converting efficiency of a dynamo or electric motor respectively is its capacity for transforming mechanical into electrical, or electrical into mechanical energy. The difference between energy units received and delivered decides the transmitting efficiency of lines of shafting, belt drives, etc.

A good example of the cumulative effect of losses due to efficiencies being less than unity is afforded by the propelling apparatus of a ship. Assuming a boiler efficiency of 75 p.c., an engine heat-efficiency of 15 p.c., a transmitting efficiency of 90 p.c., and a propeller efficiency of 60 p.c.—all well above the average—out of 100 units of heat-energy developed by the burning of boiler fuel only  $(100 \times \frac{75}{100} \times \frac{15}{100} \times \frac{90}{100} \times \frac{60}{100}) = 6.075$  p.c. are converted into useful work. See Boiler; Steam Engine.

**Effigy** (Lat. *effigies*, image, likeness). Monumental effigies on tomb-lids in Christian churches from the 13th century onwards abound in England and W. Europe. Originally carvings in low relief, which gave rise to monumental brasses, they developed into figures in the round, usually recumbent. Ancestral effigies, kept in great houses in ancient Egypt and Rome, suggested to medieval Europe the funeral effigies placed upon the biers of royal and other personages.

In primitive culture effigies are important adjuncts of sympathetic magic. There are palaeolithic cave-portraits of food-animals, speared symbolically to ensure success in hunting. The piercing or melting of waxen images to induce sickness or death, practised in early Egypt, Babylonia, Vedic India, Greece, and Rome, prevailed throughout 13th–17th century Christendom. See Numismatics.



Effigy. Two examples in wax. Left: Effigy of Queen Elizabeth in Westminster Abbey. Right (by courtesy of Messrs. Tussaud): Effigy of Queen Marie Antoinette, originally shown at Versailles

**Effingham**, EARL OF. British title borne by the family of Howard from 1731 to 1816, and again since 1837. The family is descended from Lord William Howard, a son of the 2nd duke of Norfolk. He served Henry VIII and his three children in various confidential capacities, and was in 1553 made Baron Howard of Effingham, in Surrey. His son Charles commanded the English fleet against the Spanish armada and was made earl of Nottingham in 1596. The earls of Nottingham held the barony of Howard of Effingham until their extinction in 1681, when it passed to Francis, whose son Francis, the 7th baron, was created earl of Effingham in 1731. In 1816 the earldom became extinct, and the barony devolved upon a kinsman, Kenneth A. Howard, created earl of Effingham in 1837. The titles are held by his descendants. The estates are in Yorkshire and Oxfordshire.

**Efflorescence** (Lat. *efflorescere*, to bloom). Term applied in chemistry to the changes which some crystals undergo when exposed to air. The surface of the crystals becomes covered with a fine powder, fancifully known as flowers. The change is due to the giving up of water owing to the higher vapour pressure of the crystal compared with that of the surrounding atmosphere. A familiar example is seen in washing soda, which, at first transparent, after exposure becomes opaque on the surface. The change is due to a reduction in the quantity of water of crystallisation normally present in the crystals. The word is also used in botany for the process of flowering. See Chemistry; Crystallisation.

**Effusion** (Lat. *effundere*, to pour out). Escape of a gas under pressure from the vessel in which it is enclosed, through a small opening. This escape will follow precise laws expressed by Graham as follows: "The velocity with which a gas effuses varies directly as the square root of the difference of pressure on the two sides of the opening (in the vessel and outside it) and inversely as the square root of the density of the gas."

**Ekik**. Negro tribe in the Calabar coastland, S. Nigeria. They predominate between the Cross and Ikpan rivers, and having long acted as middlemen between the white traders and the interior peoples, they are largely Christianised and Europeanised, many being in Government service. Their speech is semi-Bantu.

**Egan**, PIERCE (1772-1849). British sporting author. He spent his life reporting races, prize-fights, cock-fights, cricket matches, trials,



Pierce Egan,  
British author  
After Sharpley

and executions. He achieved great popularity as the author of a series of sketches describing London amusements in Regency times and entitled *Life in London*: or the Day and Night Scenes of Jerry Hawthorn, Esq., and his elegant friend, Corinthian Tom, accompanied by Bob Logic, the Oxonian, in their Rambles and Sprees through the Metropolis, issued in monthly parts from 1821 and illustrated by I. R. and G. Cruikshank. Of his numerous other writings Pierce Egan's *Book of Sports and Mirror of Life*, 1832, was the best. Egan died in London, Aug. 3, 1849.

**Egba** or **EGBALAND**. Province of Southern Nigeria. It is situated N. of Lagos, and is surrounded by Ibadan, Ikorodu, Badagry, and Meko. Its area is about 1,869 sq. m. Pop. 264,814 natives and 80 Europeans. The native population consists of four local tribes known as the Egba-Alake, Egba-Oke-Ona, Egba-Agura, and the Owus. The country is undulating. The S. is largely forest, especially from Oba to Igaun, but is well watered, very productive, and has large portions under cultivation. The N.W. portion is hilly and not well watered. Cotton is grown. The principal means of communication, in addition to the roads, are the Ogun river, about 150 m. long and navigable for canoes, and the main Iddo-Kano railway, which runs through the country. The capital is Abeokuta.

In 1857 the British Government established friendly relations with the Egbas, and in 1892 a treaty of protection was arranged and a council of the Egba nation formed with the Alake of Abeokuta as president. The Alake is the senior of the four kings and visited England in 1904. The country remained an independent native kingdom within Nigeria, with a British resident, until 1914, when it was placed under the direct government of the protectorate of Nigeria.

**Egbert** (d. 839). King of Wessex. The son of Ealhmund, a king of Kent, he was driven into exile to the court of Charlemagne and returned to England as king of the West Saxons in 802. He then subdued West Wales or Cornwall, defeated the king of Mercia at Ellandune, annexed Kent, and in 829 became overlord of all the English kings. He was defeated by Scandi-

navian pirates in 836, but in 838 routed a formidable army of Northmen and West Welsh at Hingston Down, in Cornwall. He died in 839 and was succeeded by his son Ethelwulf. See The Making of England, J. R. Green, 1881.

**Egede**, HANS (1686-1758). Scandinavian missionary in Greenland. Born in Norway, and educated at Copenhagen University, he was a Lutheran minister at Vaagen from 1706-17. Four years later he went with his wife and family to Greenland, where he worked among the Eskimos for fifteen years and converted many to Christianity. In 1736 he returned to Copenhagen, but continued to superintend the missions in Greenland until his death, Nov. 5, 1758. He wrote accounts of his work, and *A Description of Greenland* (1729-41), Eng. trans. 1745. See *The Story of Hans Egede*, Jans Olaf, Eng. ed. 1864.

**Egedes Land**. That portion of E. Greenland lying N.W. of Denmark Strait and N.E. of King Christian IX Land. It is named after Hans Egede.

**Eger**. River of Bohemia. It rises in the Erzgebirge in Saxony, but most of its course is in Bohemia. It flows almost due E. until it falls into the Elbe near Leitmeritz. It drains the S. side of the Erzgebirge, Eger and Karlsbad stand on it, and its length is about 140 m.

**Eger**. Town of Bohemia, Czechoslovakia. It stands on the right bank of the Eger, 92 m. W. of Prague, beneath the Fichtelgebirge. Its chief object of interest is the ruined castle on a rock above the town built by the emperor Frederick I in the 12th century. The main buildings are the old Gothic church of S. Nicholas, restored in the 15th century, and a museum; the latter was formerly the burgomaster's house, in which Wallenstein was murdered in 1634. There is an old town hall, while other objects of interest are the Schillerhaus, where the poet lived for a time, the merchants' hall, and the market place. The town has manufactures of textiles, machinery, etc. The inhabitants are mainly Germans, although the town has been part of Bohemia since 1350. Before then it was in Germany or in Austria, and was the capital of a district called Egerland. Its Czech name is Cheb. Pop. 26,619.



Egbert, King of  
Wessex  
From an old print



**Eger** OR ERLAU. City of Hungary. It stands in a beautiful and mountainous region, 70 m. N.E. of Budapest. Its chief industry is the making of red wine, the vines being largely grown on the hills around; but it is more famous for its churches. The cathedral, a handsome building in the Italian style, was erected in the 19th century; the church of the Brothers of Mercy and the minaret of an old mosque are also noteworthy. Other buildings include the palace of the archbishop, the town hall, and the observatory. The town grew up around the bishopric founded about 1010. It was taken by the Turks in 1596, and they kept it until 1687. The city was made the seat of an archbishop in 1814. Pop. 28,052.

**Egerdir.** Lake of Asia Minor. Lying between the Sultan Dag and the Taurus Mts., it is 27 m. long and from 3 m. to 10 m. wide. On it stands the town of the same name. Pop. 6,000.

**Egeria.** In classical legend, a nymph beloved of Numa Pompilius, king of Rome, who set great store by her advice and prophecies. On the death of Numa her grief was so great that she dissolved in tears, and was turned into a fountain by Diana. The name is given in modern times to a lady who stimulates and inspires a man's intellectual activity. *Pron.* Ee-je-ri-a.

**Egerton, SIR RALEIGH GILBERT** (b. 1860). British soldier. Son of Sir Robert E. Egerton, he was born Sept. 25, 1860, and joined the Leicestershire Regt. in 1879. Later he entered the Indian army, reaching the rank of colonel in 1907. He was A.A.G. of the Indian army, 1900-3. His war services include the Hazara and Waristan expeditions, the Chitral campaign and that in Dongola. During the Great War he served in Mesopotamia, especially distinguishing himself as a corps commander under Marshall, 1917-18. He was knighted in 1916 and made lieutenant-general in 1917. *See* Mesopotamia, Conquest of.

**Egerton Prize.** Award given annually by the Admiralty to the naval officer who, when qualifying for gunnery lieutenant, passes the best examination in practical gunnery. The prize was founded in 1901 in memory of Commander F. G. Egerton, R.N., killed in Ladysmith, Nov. 2, 1899.

**Egg.** Reproductive cell formed in the body of the female animal, which, when fertilised by union with the spermatozoon of the male, produces a new individual. Except in the lowest forms of life, when propagation takes place by fission or budding, every animal begins

its life history as an egg. In the viviparous animals, as in nearly all mammals, the development of the egg takes place in the body of the mother; in the oviparous it is extruded and development proceeds apart from union with the mother. (*See* Embryology.)

Only such eggs as are "laid" by the female and hatched externally to her body are here considered. This phenomenon occurs in all the phyla or sub-kingdoms of the animal world except certain of the lowest and most primitive. In the mollusca, which include the snails and the shell-fish, eggs vary considerably in form and size. In the largest of the British snails (*Helix pomatia*) the egg is enclosed in a chalky shell, and is as large as a moderate-sized pea; while one of the snails of Barbados (*Strophocheilus oblongus*) lays a white egg as large as that of a pigeon.

Some insects, as the moths and butterflies, lay an enormous number of eggs; but the most prolific animals of all are the fishes. The ling produces more than 500,000 eggs to each pound of her weight; sturgeon is credited with about 7,000,000 eggs.

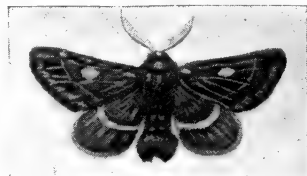
Nearly all reptiles lay eggs. Those of the crocodiles and tortoises have hard, limy shells, but most are enclosed in membranous capsules. Those of the amphibians, like the frogs and newts, are deposited in gelatinous masses. Speaking generally, eggs laid in the water or in wet places are without hard external coverings.

All birds deposit eggs, varying immensely in size and colour. In size they range from that of the ostrich, which equals about twelve hen's eggs, to the tiny productions of the humming-birds. The colouring of birds' eggs is of a protective nature, and is usually adapted to the surroundings. The eggs of razor-bills and guillemots, which lay on exposed edges of rocks, are of tapering shape, so that when disturbed by wind or by a passing bird they simply turn round. Among the mammals, eggs are laid only by the ornithorhynchus and the echidna. *See* Biology; Cell.

**Egg, AUGUSTUS LEOPOLD** (1816-63). British artist. Born in London, May 2, 1816, he studied under Henry Sass and at the R.A. school, exhibited for the first time in 1838, became an A.R.A. in 1848, and R.A. in 1860. A subject painter, his best work includes Queen Elizabeth Discovers She is No Longer Young, 1848; Peter the Great Sees Catherine for the First Time, 1850; and The Night Before Naseby, 1859. He died at Algiers, March 26, 1863. *See* illus. 8, p. 2569.

**Egga.** Town of N. Nigeria. It stands on the right bank of the Niger, a few miles above Baro, the terminus of the Baro-Kano rly. It is the commercial outlet of the Gando country. Pop. about 10,000.

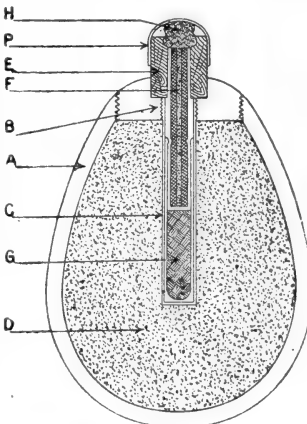
**Eggar Moth.** Group of fairly large moths. There are four British eggar moths, belonging to three



Eggar Moth. Example of small eggar moth, *Eriogaster lanestris*

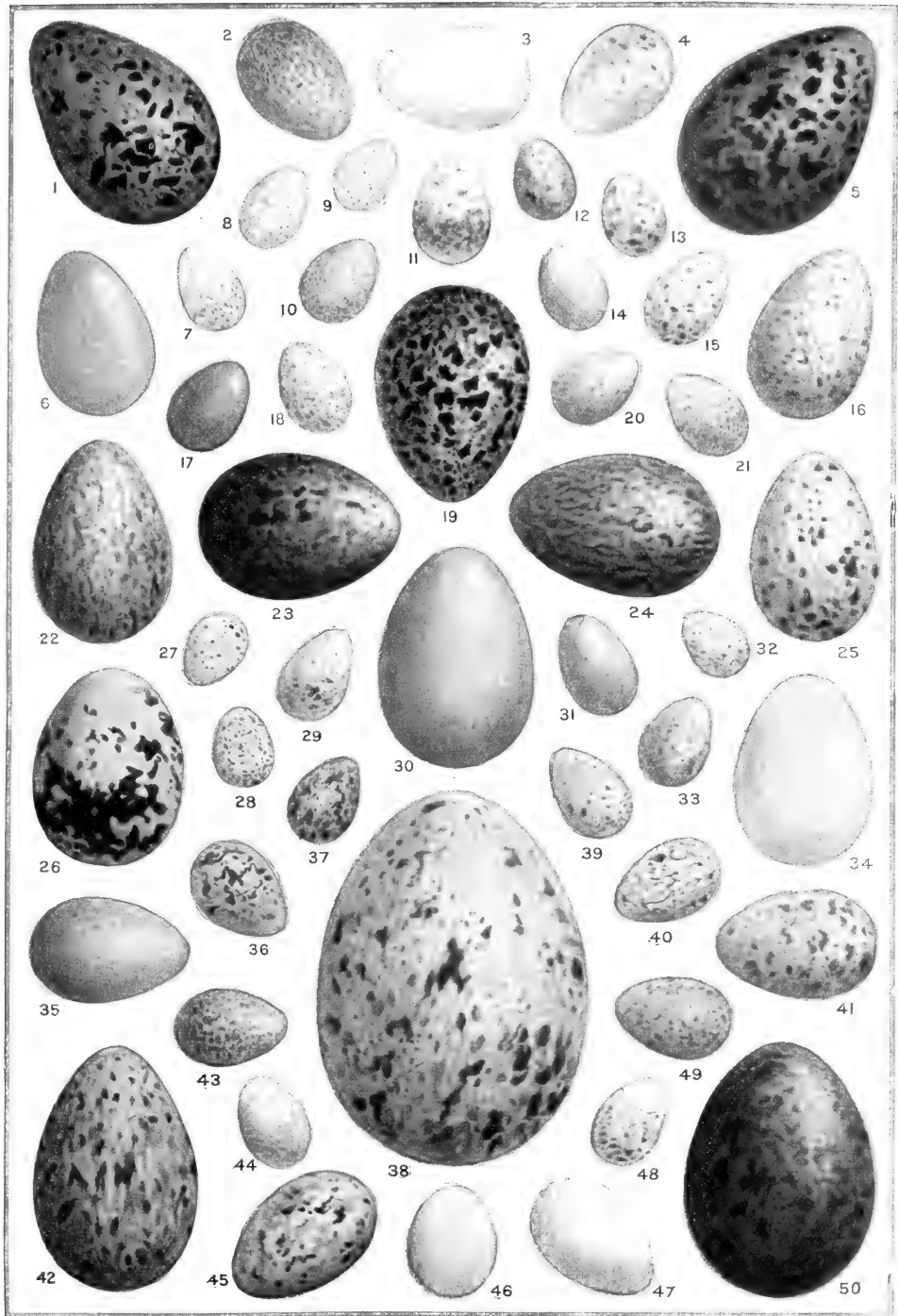
distinct genera. Three of them are reddish-brown in colour and the other is grey; the expanse of the wings varies from 1 in. to 3 ins.

**Egg Grenade.** Simple type of time fuse hand grenade largely used by British forces during the



Egg Grenade. Sectional diagram showing principle of the grenade. For explanation see text

early part of the Great War. It consists of an egg-shaped cast-iron body, A, closed by a screw plug, B, which carries the detonator holder, C, and the grenade is filled with explosive, D. The fuse consists of a wooden plug, E, carrying a short length of safety fuse, F, to the lower end of which is crimped the detonator, G. In the upper end of the wooden plug is a large bead of friction composition, H, the other end of the fuse touching this composition. A piece of waterproof paper, P, is secured over the end of the plug to protect the composition. The explosive used is ammonal or a similar ammonium nitrate explosive. *See* Ammunition; Explosives; Grenade; Mills Bomb.



1. Lapwing. 2. Blackbird. 3. Green woodpecker. 4. Song-thrush. 5. Golden plover. 6. Partridge. 7. Goldfinch. 8. Lesser redpole. 9. Common wren. 10. Pied wagtail. 11. Red-backed shrike. 12. Whitethroat. 13. Marsh warbler. 14. Whinchat. 15. Swallow. 16. Magpie. 17. Nightingale. 18. Spotted flycatcher. 19. Red grouse. 20. Robin. 21. Tree pipit. 22. Rook. 23. Kestrel. 24. Carrion crow. 25. Jackdaw. 26. Sparrowhawk. 27. Chiff-chaff. 28. Great tit. 29. Bullfinch. 30. Pheasant. 31. Hedge-sparrow. 32. Blue tit. 33. Blackcap. 34. Barn owl. 35. Jay. 36. Common bunting. 37. Reed warbler. 38. Golden eagle. 39. Chaffinch. 40. Yellowhammer. 41. Missel thrush. 42. Raven. 43. Skylark. 44. Stonechat. 45. Nightjar. 46. Kingfisher. 47. Starling. 48. Linnet. 49. Cuckoo. 50. Peregrine falcon.

# EGGS OF FIFTY BIRDS THAT FREQUENT THE BRITISH ISLES

*Specially drawn for Harmsworth's Universal Encyclopedia by J. F. Campbell*



**Eggishorn.** Mountain of the Bernese Oberland, Switzerland, in the canton of Valais. It is the loftiest peak of the ridge separating the Aletsch Glacier from the Rhône Valley. Alt. 9,625 ft. On its S.E. slope is the Jungfrau-Eggishorn Hotel, at an alt. of 7,195 ft.

**Egg-plant** (*Solanum melongena*). Herb of the natural order Solanaceae. The leaves are oval, lobed, and woolly beneath; the flowers are similar to those of the tomato, white, yellow, or purple. The fruit, a berry as large as a goose-



Egg-plant. Specimen of the edible herb, showing leaves, flower, and berries

egg, is white or purple. The herb is edible, and largely grown for food. It is also called brinjal, Jews' apple, and rind apple.

**Egg Society.** Cooperative syndicate for collecting the eggs of small producers, grading and marketing them. Some counties have as many as nine or ten egg societies, and one society will collect and dispose of 10,000 eggs in a single season.

**Egg Testing.** Eggs are tested by holding them to a light, special lamps being sold for this purpose. A perfectly fresh egg is quite clear and uniform. An egg that has been kept some time has a space at one end owing to evaporation through the shell, and sometimes air bubbles are scattered about the interior. When the egg is bad the interior shows dark spots and the yolk is often seen clinging to the side of the shell. In large egg stores eggs pass on an endless chain over a brilliant light and the examiner removes those that are not fresh.

**Egham.** Urban dist. and parish of Surrey, England. It stands on the Thames, 21 m. W.S.W. of London by the L. & S.W.R. Here are the Royal Holloway College, which provides advanced education for 250 women, and Holloway Sanatorium, a large private asylum for the mentally deficient, opened in 1885. Pop. 12,551.

**Egin** OR **Ekim.** Town of Armenia, in the vilayet of Mamuret-ul-Aziz. It stands on the right

bank of the Kara Su or Western Euphrates, 140 m. S.W. of Trebizond, and was the scene of massacres of Armenians in 1895. During the Great War it was occupied by the Russians in 1915, and abandoned by order of the Bolshevik government during the winter of 1917-18. Pop. 8,000.

**Eglantine.** Name applied by the earlier poets, notably Chaucer, Spenser, and Shakespeare, to the sweet briar (*Rosa eglanteria*). In Milton it probably refers to the honeysuckle (*Lonicera periclymenum*), still called eglantine in parts of Yorkshire. See Sweet Briar.

**Eglinton.** Village of Ayrshire, Scotland, in the parish of Kilwinning. It is chiefly notable for its castle, a seat of the earl of Eglinton. This is a modern building dating from 1798, but modelled on the baronial castles with towers and a keep. The village is on a coal-field, and near are large ironworks and coal mines.

**Eglinton, EARL** OR. Scottish title held by the family of Montgomerie since 1508. Sir Alexander Montgomerie was made a lord of the Scottish parliament about 1445, and his grandson Hugh, the 3rd lord, was made earl of Eglinton in 1508. Hugh, the 3rd earl, was a supporter of Mary Queen of Scots.

and when the 5th earl died the family in the male line became extinct. The titles and estate then passed by special settlement to Alexander Seton, a grandson of the 3rd earl, who became the 6th earl, taking the name of Montgomerie.

Archibald, the 11th earl (1726-96), served in America against the French. His successor, Hugh, became earl in 1796, and was made a peer of the United Kingdom in 1806. He was responsible for building Eglinton Castle. His grandson and successor, Archibald, the 13th earl (1812-61), a Tory politician, was the organizer of the famous Eglinton Tournament. In 1859 he was made earl of Winton, a title held by his ancestors. the Setons.

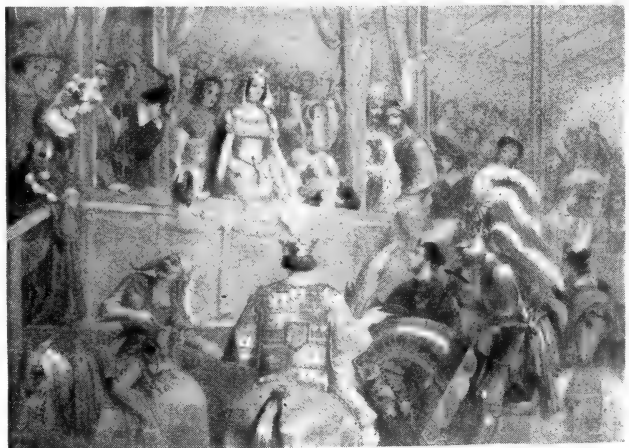


Eglinton. The castle, built in 1798, seat of the Earl of Eglinton, and scene of the famous tournament

Valentine

The earl's eldest son is known as Lord Montgomerie.

**Eglinton Tournament, THE.** Revival of the medieval tournament by the 13th earl of Eglinton. It was held at Eglinton Castle, Aug.



Eglinton Tournament. The Lord of the Tournament, the Earl of Eglinton, being presented to the Queen of Beauty, Lady Seymour

From a contemporary print

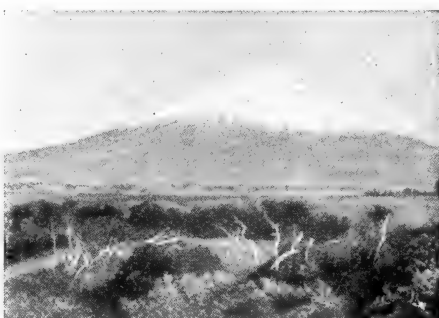
28, 1839. The week's pageant was entirely spoiled by rain. Arrayed in complete suits of armour and representing characters in chivalry, some 15 knights tilted in ancient fashion, breaking their spears in the jousts and finally paying their devoirs to the queen of beauty, Lady Seymour, afterwards duchess of Somerset.

**Egmont.** Cone of an extinct volcano, North Island, New Zealand. It rises from the Taranaki plain to a height of 8,260 ft. It is perpetually covered with snow, and is a well-known landmark for sailors.

**Egmont, EARL OF.** Irish title borne since 1733 by the family of Perceval. In 1661 Sir John Perceval was made a baronet, and the baronetcy passed in turn to several descendants, being inherited in 1691 by another Sir John (1683-1748). He was an M.P., and the first president of Georgia, which colony he helped to found. He was made baron, viscount, and earl.

John, the 2nd earl (1711-70), was a prominent politician in the time of George II. From 1761 to 1766 he was first lord of the Admiralty. In 1762 he was made a British peer as Baron Lovel and Holland, and with that title the present earl sits in the House of Lords. Spencer Perceval, the prime minister, was his son. For long the earls lived at Cowdray Park, Midhurst, but early in the 20th century it was sold to Sir Weetman Pearson, later Viscount Cowdray, and the earl's seat is now Avon Castle, Ringwood, Hants. The title is taken from a little place in co. Cork, near where, at Burton House, the earlier Percevals lived.

**Egmont, LAMORAL, COUNT OF** (1522-68). Flemish statesman. He was born at La Hamaide Castle, Hainault, Nov. 18, 1522, and in 1541 was with Charles V on his expedition to Algiers, and in subsequent campaigns against France. In 1545 he married a sister of the elector palatine and later was ap-



Egmont. The snow-capped cone of the extinct volcano of North Island, New Zealand

pointed governor of Flanders. In spite of his proved loyalty to the Spanish government he fell under suspicion, and was beheaded at Brussels, June 5, 1568. His life forms the subject of Goethe's well-known tragedy (1788). In 1865 a monument to his memory was erected in Brussels. See Rise of the Dutch Republic, J. L. Motley, vols. i-ii, new ed. (World's Classics), 1906.

**Ego** (Lat., I). In philosophical terminology, the thinking subject as distinguished from that which does not belong to it—from the object, the non-ego (not-I). It is the constant factor of the data of experience, identical and permanent in all living, conscious beings. In spite of the constant change in the physical individual, the ego continues the same. Thus, if I am writing at one moment and reading at another, the I is the same in both cases.

**Egoism** (Lat. *ego*, I). In philosophy, the theory that only "I" exist, and that everything else is only an idea of this "I." This is now more commonly called solipsism (*solus*, alone; *ipse*, self). Egoism is more generally understood as the theory of self-interest, which leads a person to act with a view to securing pleasure or advantage for himself without any consideration for others. Egotism, as distinct from egoism, is thinking or telling too much about oneself.

**Egoist, THE.** Novel by George Meredith (q.v.), published in 1879. If not great as a story it is yet one of Meredith's greatest prose works. In the central character, Sir Willoughby Patterne,

is presented a remorseless delineation of egoism fostered by circumstance.

**Egremont.** A town and ecclesiastical district of Cheshire, a residential suburb of Liverpool and Birkenhead. It stands on the S. side of the Mersey, 2 m. N.W. of Birkenhead, and, with Seacombe, has a station on the Wirral Rly.

Tramways and a promenade connect it with New Brighton, while steamers go regularly from here to Liverpool. Pop. 15,961.

**Egremont.** Urban dist. and market town of Cumberland, England. It stands on the Ehen, 5 m. S.E. of Whitehaven and close to the Irish Sea. An ancient town, Egremont was a parl. bor. in the reign of Edward I, and has ruins of a 12th century castle. Iron ore is mined and limestone quarried. Market day, Sat. Pop. 6,305.

**Egremont, EARL OF.** British title borne by the family of Wyndham from 1750 to 1845. It was



Egremont  
After T. Phillips, R.A.

first a subsidiary title of the 7th duke of Somerset, Algernon Seymour, for whom it was created in 1749. From him it passed, in 1750, by special arrangement to his nephew, Sir Charles Wyndham, Bart. (1710-63), who was secretary of state from 1761-63. The 3rd earl, George O'Brien Wyndham (1751-1837), made Petworth, his Sussex residence, noted for hospitality. When he died he left his estates to his natural son, George Wyndham, who was made Baron Leconfield in 1859. The title, however, passed to a nephew, and became extinct on his death in 1845.

**Egret.** Name applied to several species of small white herons, of which the little egret is one of the best known examples. It occurs very rarely in Great Britain, but is common in S. Europe and in many parts of Asia and Africa. See *Aigrette*.

**Egri Palanka.** Town of Yugoslavia. It is situated on the high road from Uskub to the Bulgarian frontier. It is a trade centre of strategic importance. Pop. 5,000.



Egremont, Cheshire. The promenade, looking toward the tower at New Brighton

Vaillantou



# EGYPT: IN ANCIENT AND MODERN TIMES

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*This article is divided into two main parts, one dealing with the Egypt of old, and the other with the modern country. The former describes its wonderful civilization; the latter includes its history until its grant of independence in 1920. There are also articles on the Pyramids, on Dendera, Karnak, and other famous places, and on the various rulers. For modern Egypt see the biographies of Cromer, Kitchener, Mehemet Ali, and others. See also Suez Canal; Turkey; Alexandria; Cairo*

Egypt, owing to its unique climate, the amount of sunshine being more than tropical, is one of the most important lands in the history of man. Its productive power is unrivalled, while the usual N. wind makes it cooler

**Egypt. Arms in Turkish period**

than any country of that latitude, except ocean coasts. These conditions, with a very healthy climate, made it particularly fitting for the growth of an early civilization. The advantage of having excellent building stones along the whole valley, with easy water transport, and the necessary lack of agricultural work during the inundation for a third of the year, were the most favourable conditions for a great architecture. The extreme dryness of the country has further led to the wonderful preservation of even the frailest materials. It is thus possible to take a longer continuous view of human changes than in any other land. The only hindrance is that, the Nile bed and water level of the country having risen about 5 ins. in every century, the early dwellings of man in the plain are now 20 ft. under water.

## Earliest Human Work in Egypt

The Nile Valley began its history as a fault in the Eocene limestone which covers the surface for 400 m. from the sea. This was much raised on the E. side, up towards the Red Sea mts., while on the W. side the surface dips down in the Fayum to more than 100 ft. below sea level, and also in the oases. The fault in the strata, due to this strain, naturally received the drainage of the plateau, and so gouged out the Nile Valley. The continuous changes in the history of the country that can be observed begin with the first interglacial period, when there is evidence of a fall of sea level about 300 ft. below the present, compared with 200 ft. in Europe. Next came, in the second glacial period, a rise of the sea to 650 ft. above the present level, compared with 900 ft. in Europe. Of these two ages no human remains have been found in Egypt.

The earliest human work in Egypt is of the second interglacial age, that of the grand Chellean

flint work of Europe, fully equalled in Egypt. This would be placed by some authorities at 250,000 years ago. The sea had retreated in Europe to 600 ft. below the present level, making land continuous from Africa to far W. of Ireland. The climate was warm and dry, and mankind took a step forward in the artistic perception, shown by the imperishable flint remains.

## A Rainless Land

To this succeeded the third glacial period, long ages of cold and high sea level, cutting Europe into scattered islands. The misery of this age is seen by the decay of the only art we can trace—flint working. In Egypt the sea level rose to 800 ft. over the present, like the rise of 700 ft. in Europe. The Nile Valley and its tributaries were silted up with rolled gravel and sand, which still remain in some places cut through by later clearances; and rolled beds of gravel are found at the top of high cliffs. After this, when the sea retreated and the Sahara dried up, there was no more moist wind to form rain, and Egypt became the rainless land we now know. Of the later stages of the stone age in Europe, known by the artistic products of cave man, there are the equivalents in Egypt on the surface. Flints of Mousterian, Aurignacian, and Solutrian types are found in sites on the desert; and the Magdalenian types are those of the prehistoric civilization which can be traced generation by generation into historic times.

## 1ST PREHISTORIC CIVILIZATION.

The earliest step of the unbroken line of civilization is found in burials in shallow circular pits in the ground. The body is doubled up, with the knees near the chest, and the hands before the face, lying on the left side, head south. This is the regular attitude down to the historic period. The earliest burials have no woven cloth, the bodies being wrapped in goat skins; usually a single cup of pottery lies near the face, rarely some steatite beads are found, while a copper pin shows that metal was already known, though very likely only native copper hammered. Such is the beginning of the great civilization of Egypt, which we can follow through seven ages of decay and revival, without a break, down to our own days.

The next change was the introduction of more pottery in the graves, and the decoration of it with patterns of white lines on the red polished surface. The colouring materials and the patterns are exactly like those of the highland Algerian pottery of the present day; and, as the skulls of the prehistoric Egyptians are almost exactly of the same size as those of the prehistoric Algerians, it seems that these earliest civilized Egyptians were all one with the N. African people. Stone vases, usually of basalt, were also made, entirely formed by handwork, without turning. Slate palettes became usual for grinding the malachite which was painted round the eyes as a preservative. The palettes were made in the forms of the elephant, stag, turtle, bird, fish, etc. Ivory combs to fasten the hair were usual, with figures of animals standing upon them. Flint working was highly developed, equal to the best European, and only exceeded by some in the next age. The whole civilization seems to have been much on the level of the Maori, or the best Pacific island stage.

## Beginning of Written History

The method by which the prehistoric age is reduced to its order of growth may be briefly stated. If we have a full record of all the varieties of pottery and other objects, found in a thousand, or more, groups in graves, then it will be seen that some forms are obviously derived by degradation from others. A rough classing by such means can be extended by statistics of the percentage of forms like those already classed; this is similar to the percentage of recent shells in various Tertiary strata. By many other modes of sorting and comparison, the various groups can at last be put in their most probable order, which will be that of keeping all resemblances as close together as possible in the series. Such a series, extending over all the prehistoric civilization, is divided into numbered stages, from 30 to 78, at which point the first dynasty begins the written history. The order of the prehistoric time is therefore stated, not by years but by sequence dates from S.D. 30 to S.D. 78; roughly these stages seem to have been at least a generation each.

**2ND PREHISTORIC CIVILIZATION.** The 1st period, as we have said, begins with S.D. 30, a number assigned to leave room for any earlier discoveries. By S.D. 36 considerable changes begin; new types of pottery rapidly appear, and others die out between 38 and 43. The older stone forms cease at S.D. 40, the newer forms begin at 39. New materials come in, silver at 38, lazuli at 39, haematite at 40. In every direction a new style begins. In the pottery the characteristic is a class of light brown hard ware, decorated with painting in red lines, and evidently copied from stone forms, in place of the basket patterns of the older pottery. The links of various kinds are with the E. rather than the W., and it seems likely that the capital was Heliopolis, which was a prehistoric centre of worship.

The climax of this civilization was about S.D. 55. Much more metal was used; the flint flaking reached a perfection of skill not known anywhere before or since; the hardest stones were perfectly cut for vases; gold, amethyst, turquoise, obsidian, and porphyry, all came into use; the invention of glazing—applied to stone—started then. The spread of commerce is shown by the figures of large ships upon the pottery.

#### The 1st Historic Civilization

In later prehistoric bodies there is seen, in some forms, a considerable change toward the historic types. Probably for some centuries before the 1st dynasty a fresh race had been permeating the country. At last a body of about a tenth of the number of the male population entered Egypt as conquerors. They seem to have started in Upper Egypt, and it is probable that they came across the desert road from the Red Sea to Koptos. They were of a higher civilization than the natives, bringing with them the elements of writing, and a great artistic skill, as well as more organization. They held Upper Egypt at first, centring at Hierakonpolis (40 m. S. of Thebes), and later at Abydos (40 m. N. of Thebes). Thence they conquered down to near the Fayum, where they centred about S.D. 77-78. Memphis became the capital in S.D. 79 under Menes and his successors of the 1st dynasty.

At this point we touch the continuous written history of the country. About the close of the IVth dynasty the Egyptians set up an engraved chronicle, known as the Palermo stone, stating the main event of every year, and the height of the Nile, from the beginning of the 1st dynasty. Later

there were papyri containing complete lists of the kings, with the reign of each stated in years, months and days, and summaries. Parts of such a papyrus of the XVIth dynasty remain, known as the Turin papyrus. There are monumental lists of kings at Abydos, set up in the XIXth dynasty, but only of the best known periods. Lastly, there are the transcripts of a Greek version of the history compiled by Manetho, which, with many minor corruptions, gives a consecutive record of the whole of the dynasties. All these records agree in their general account, they agree with the total reckoning quoted by Herodotus, they agree with the various external checks—astronomical and others—that can be discovered. This account is therefore accepted here; but many writers prefer to abandon the authorities, and construct fanciful systems of shorter length, bringing down the 1st dynasty from 5500 B.C. of the Egyptian record to about 3000 B.C.; all dates before 1587 B.C. are also reduced.

The 1st dynasty (about 5600-5300 B.C.) was the highest point of the Third civilization. Much of the old arts continued; the hard stone vases, the rich burials, the style of pottery, all show continuity. Yet there was an immense change: writing became usual; a large official class had arisen to administer the country, each office, with its seal, down to the gatherer of lotus seed; jewelry shows skilful work; building both in wood and in brick was much increased; ivory carving was excellent for its natural character and freedom of expression; the use of copper was much extended; and glazing became a decorative art for building. The IIInd dynasty was only a gradual decay, but the IIIrd shows a fresh influence which led up to the greatest age of all.

#### Glories of the IVth Dynasty

The IVth dynasty (about 4800 to 4500 B.C.) established the Fourth civilization. The Egyptians here reached the highest mastery of art, of grandeur, and of conception. Never has the immensity or the accuracy of the great pyramid of Khufu (Cheops) been equalled in later ages; never has there been a greater expression of character and dignity than in the portrait sculpture; never has any people created a greater mass of artistic detail for their tombs, and presumably also for their dwellings now lost to sight. The personal character shown in the portraiture is most attractive; the firmness with kindliness, the dignity unspoiled by

mere pride, the vigour, insight, determination: all this agrees with the ideal character set out in the maxims of that age: "If thou art found good in the time of prosperity, when adversity comes thou wilt be able to endure"; "Let thy heart be overflowing, but let thy mouth be restrained"; "The cautious man succeeds, the accurate man is praised"; "I am one that smooths difficulties; I am one prudent in preventing and easing grief, quieting the mourner with pleasant speech"; "Make not terror among men." During the Vth and VIth dynasties Egypt retained its great civilization, diminished in some respects, with wider diffusion but less care and splendour. By the VIIth dynasty, about 4000 B.C., foreigners were pressing into the country. The old art lingered on in an absurdly degraded form during four centuries.

#### The Coming of the Syrians

The XIIth dynasty (about 3600-3400 B.C.), established the Fifth civilization. By the middle of the XIth dynasty the princes of Thebes began to spread their power, large tombs were again excavated, and monuments carved. The XIIth dynasty reunited all the country, and pushed up into Nubia, civilizing and consolidating that region at least as far as the third cataract (lat. 20°). The most magnificent king of this age was Amenemhat II, whose sepulchre was a tank, cut and polished in a block of glass-hard sandstone, 22 ft. long inside, and weighing 100 tons. He reclaimed a large part of the Fayum which had been till then a swamp. The whole character of the age has less originality and freshness than before, more regularity and exact detail, and a more formal treatment of every subject. The Syrians were beginning to press into the country, and in the decadent dynasties, the XIIIth and XIVth, some even rose to be kings. These were the forerunners of the great Hyksos conquest about 2600 B.C.

The XVIIth-XXth dynasties (1587-1102 B.C.) established the Sixth civilization. The XVIIth dynasty was a Nubian family which headed the southern Egyptians against the Hyksos, who were finally expelled from Egypt by Aahmes, the founder of the XVIIIth dynasty. This revival centred specially at Thebes, which became the largest city of the time, and has left a great mass of temples and painted tombs. The most important aspect of this age was the foreign intercourse, by conquest in Syria and by trade with Babylon, Crete, and Greece.

By about 1530 B.C. Tehutmes' I had conquered all Syria out to the Euphrates near Aleppo. All this was retained until the wars of Tehutmes III, about 1460, and almost as much until the crumbling of the foreign hold under Akhenaten about 1370 B.C. In the XIXth dynasty Sety I recovered Syria entirely, about 1320 B.C.; and Rameses II, though pressed by the Hittites, kept the greater part of that land till about 1250. After that, Egypt barely held a little of the S. of Palestine. On the W. Egypt did not extend any political influence, and the connexion was only by trade, which is mainly seen by objects of Amenhotep III, about 1400 B.C., at Mycenae and other centres, and by great quantities of Greek vases imported into Egypt, especially about 1370 B.C. When Egypt became weakened, there were great coalitions of the Algerian and western peoples against it in 1229 B.C. in the reign of Merneptah, and again in 1197 in that of Rameses III. This was followed by a coalition of Syrians and western peoples in 1194, who were overthrown in a great naval battle.

#### Semitising of Languages and Art

The frequent wars in Syria led to the bringing of great numbers of Syrian men and women into Egypt, and so to the semitising of Egyptian language and art. A greater change took place in 100 years than had arisen in 1,000 years before. The fashion of the time was for a light and piquant style, as seen in Crete; and the sober matter-of-fact Egyptian responded to it, with fatal results to his own character. Graceful and pleasing as many of the tomb scenes are, they have none of the solidity of the old tomb sculptures or paintings on hard rock; a mere coat of plaster or mud over a very rough chamber, all askew and irregular, was sufficient grounding for the perishable colour washes, which would be ruined by a touch of water; the older work was so firm that it could be scrubbed without removing the colour.

The XXIst dynasty (1102-952 B.C.) was an age of poverty and weakness. The land was amicably divided between a succession of priest-kings at Thebes, and the kings at Tanis in the Delta. The main interest lies in the desperate attempts to save the mummies of the kings of the XVIIth-XXth dynasties from destruction by robbers. After many had been attacked, and most had been examined and shifted about for safety, the priest-kings at last made one great *cache* at Deir el Bahri, which was left unopened

because it was known that no gold remained with the bodies. Thus it was left until our times, and we can now see most of the celebrated kings of this age face to face in the Cairo Museum.

The XXIInd and XXIIIrd dynasties (952-721 B.C.) revived the power of Egypt somewhat. They were due to the energy of a Mesopotamian adventurer, Sheshenq or Shishak, and his family, who settled at Bubastis. But there was no revival in the life of the country, the products were only a continued degradation of the style of the XIXth dynasty.

The Ethiopian invasion about 727 B.C. found Egypt split up among eighteen or more little states, but it seems to have put fresh life into the country, and a real revival of work can be seen. The Ethiopian kings who ruled till 664 B.C. were vigorous and able men, and they had a good system of appointing the crown-prince as viceroy of Egypt, so that there was energetic management under experienced control.

The XXVIth-XXXth dynasties (664-342 B.C.), founded the Seventh civilization. They were under Ethiopian influence and then largely controlled by Greek action, and under Persian rule. There was some revival of energy abroad. Necho in 609 raided all Syria to the Euphrates and held it more or less for four years, when the new power of Babylon defeated him, and he retired to Egypt. The Persians held the country from 525 to 401 B.C., and then the native Egyptians in the Delta revived for a couple of generations, forming the XXIXth and XXXth dynasties, 399-342 B.C. Ten years of miserable destruction under the degenerate Persian ushered in the golden age of Alexander's conquest.

#### The Rule of the Ptolemies

The transition from Alexander and his heir to the rule of the old general Ptolemy Soter (the Saviour) was very gradual. Ptolemy, it may be said, ruled from the death of Alexander in 323. The earlier of the family were very able men, wary, strong and enlightened, backed by powerful queens of their own family. Egypt had not been so peaceful and prosperous for some centuries as it was from 300 to 200 B.C. Even under the effete rule of the later Ptolemies, the country was one of the most learned and richest in the world. This dynasty possessed Cyprus and Cyrene for a long time, and parts of Syria and the S. of Asia Minor in the intervals of the perennial squabbles with the Antiochi.

THE ROMAN AGE (30 B.C. to A.D. 640). The end of Egyptian inde-

pendence was the death-stroke to the country. From being one of the richest lands, it became the milch-cow of the emperor of Rome, the private property of the Crown. It was steadily drained of all wealth, taxed in corn to feed Rome, taxed in money, and after three or four centuries even the shabbiest copper coin ceased to be struck, and the people were reduced to barter. Occasional massacres were about the only events that marked the Roman rule.

#### The Arab Rule (A.D. 640-1517)

This was the Eighth Civilization. The Roman government collapsed before a few thousand wild Arab horsemen. Yet such was the vitality of the country, that under the alien but just rule of the Arab, within two centuries the land tax alone produced six or seven million sterling—far the largest revenue of any country of that age. There can be no comparison between the advantages of Roman and of Arab rule. Yet that, like all other power, decayed, and the Mamluk dynasties, for some centuries before the Turkish conquest, were a ceaseless turmoil of fighting and plundering. This unrest was renewed when Turkish power waned, and only the strong hand of Mehemet Ali recovered the advantages of a united government.

THE PEOPLE. Egypt, in spite of its isolated position, has been subject to continued mixtures of race. Starting with an Algerian stock, there have been four or five inflows from the E., two more from the W., a large Greek population in the Delta, and continual mixtures of Southerners from slave labour. Yet the national type of character has remained much the same, and the skull measurements after each mixture return in a few centuries to the older size. Agriculture has always been the main industry of the country, the regular inundation and strong sunshine making it very profitable. Cattle are not kept in large numbers, as all the fertile land is inundated for a third of the year, and there is no permanent pasture. The usual feeding of cattle is by tethering in green crops, or by hand in the summer.

The ancient organization, which may still be seen in the remote country, is for each district to be the property of a great man—anciently an hereditary noble. The police and guards of his district were his personal servants. On his estate he kept workmen for all current purposes; in his great house lived all the artificers that were needed for manufactures; weavers, carpenters, smiths, jewellers, boat builders all belonged to the establishment, and worked as directed. Trade was



mostly in petty market wares, and in raw material not produced on the estate. The government was on the same model. The royal court was only the greatest of the nobles' estates, and the ordinary government was carried on by the officers of the king's household, who only interfered when needful with the local administration of the nobles. It was something like the British control over the native states of India. When a noble wanted great blocks of stone, or anything only produced on the royal estates, he applied, and was granted the present of the material. The tribute sent from different nobles to the court was trifling, merely pin-money for personal use, showing that all cost of government was borne locally by the nobles. The system gave great social stability to the country, everything went on as usual, whether the king was strong or weak. The only purpose of the kingdom was to prevent local fighting and to unify the land for defence.

The official class was probably always corrupt; the management of cases and witnesses under Rameses X reads like modern police work. Where a capable noble can be found, the purely local administration is more likely to be just than where a centralized professional police are in authority.

The army was originally on a small scale, probably the king's people from his estates. By the XIIth dynasty the scribe of recruits is found, and in the great military age of the XIIIth-XXth dynasties the recruiting was severe in Egypt.

#### Native Troops and Auxiliaries

The army was divided into four brigades, named after the great gods of different regions; the army of Amen from the Thebaid, that of Ptah from middle Egypt, that of Ra from the upper Delta, and that of Sutekh from the E. and lower Delta. Besides the native troops, there were many auxiliaries—Libyan and negro archers in early times, Sardinian and other Mediterranean folk later. The Greek accounts of the army forming a regular caste with hereditary lands, was probably a continuation of the Rameside system. The Ptolemies further settled Greek troops, largely in the basin of the Fayum, which they reclaimed by reducing the inflow of the Nile.

The position of women was always high until the Arab conquest. Property was essentially held by women. A man might even have to declare at marriage that all his earnings passed to his wife. Down to Coptic times a wife's

consent was necessary for a valid sale in an open market; even though a mere formula, it proves original intention. The wife always appears side by side with her husband on monuments, and parentage was almost always reckoned one or two generations farther back on the female than on the male side. Apparently the inheritance to the kingdom depended entirely on the female line, and whoever was king in fact had in law to marry the heiress. Polygamy was unusual but not prohibited; in one case of a childless wife the husband took six others. There is no ceremony of marriage preserved, and as in Christian Egypt it was a legal contract, rather than religious, it was doubtless so before then. In the Christian contract there was a divorce clause, stating that either party could cause divorce by proclaiming it in the congregation. The husband's gift was only 12s. and the divorce penalty seven times that sum. In the XXVth dynasty the penalty was only the returning of half the marriage portion.

#### Simplicity of Native Costumes

Dress was simple, befitting the climate. In prehistoric ages the men wore a girdle, the women a short linen petticoat like the Dyaks, or later the Malay *sarong*. The dynastic men wore a waist-cloth or kilt, like that enjoined by Mahomet, from the navel to the knees; the women wore a long, white wrapper, from below the breast to the ankles, held up by shoulder-straps. These remained the dress represented in art till the XIXth dynasty; but in reality, as early as the Vth dynasty women wore tight, high dresses with very tight sleeves, like the modern *galabiyeh*. At the same period, pleated linen drawn into folds was also used. In the late XVIIIth dynasty and onward, very full pleated linen dresses were used for men and women. For the winter, a thick, quilted robe was worn, as shown on an aged king of the Ist dynasty; thick, stiff, long wrappers were usual for viziers and high officers in the XIIth dynasty. In Greek times, thick outer wraps, often with fringes, were usual. Stuff with very long, loose threads all over it, like a shaggy fur, was woven in the XXIst dynasty. The weaving of coloured patterns began in the XVIIIth dynasty, but was extremely rare. The common use of colour patterns on clothing is entirely of the Roman period, and most used in the Christian age, as satirised by Jerome.

**EDUCATION.** The Egyptian was always business-like, and kept tallies of all goods, from the Ist dynasty onward. A tally of the XVIIIth dynasty gives the ensign of the Nile boats and the number of blocks of stone which each carried. From these tallies elaborate accounts were drawn up, listing every goat or pigeon on an estate, or putting down as gifts to the gods every item of 106,792 loaves of one kind or 1,975,800 noseays. Every noble had a staff of scribes on his estates to keep all the bailiffs' accounts, and they are very often shown in the tomb sculptures. By far the greater part of the documents that are preserved of all periods are the accounts. This proves that there was a large class of men all through the country who could write, though probably the peasant or petty trader was not as well educated as in Babylonia.

Education was probably in general from father to son, but in the XVIIIth dynasty schools were attended in the towns. A rough and practical geometry was used by the scribes, for the areas of fields and the contents of conical granaries. There was certainly also a much more skilled geometry and astronomy by the pyramid builders, who were capable of setting out a building true to 1 in 10,000 and positions by the stars to 1 in 1,000. In the XVIIIth dynasty the clepsydra or water clock was made as a wide conical vessel, to compensate for the quicker flow of water at greater pressure, and was graduated for each month to compensate for the changes of temperature. In the same age botany was studied, and Tehutmes III sculptured a chamber with the foreign plants of his Syrian wars, having separate figures of fruit and seed like a botanical work. The Egyptian always had a keen eye for differences of race, and showed on monuments the types of all the peoples that he visited.

#### Egyptian Literature

The literature begins in the pyramid period with maxims and wonder-tales of magicians, parallel to medieval tales of miracles. In the XIIth dynasty tales of foreign adventure were in fashion, succeeded in the XVIIIth dynasty by tales of character. The growth was therefore much the same as in the last few centuries in Europe. There were also serious works which showed the deeper thoughts of the time. In the XIth dynasty they wrote:

Since the time of the ancestors—  
The gods who were *afortune*—  
Who rest in their pyramids . . .  
Their place is no more . . .



None cometh from thence . . .  
 That he may tell how they fare . . .  
 Until we depart  
 To the place whither they have gone.  
 Encourage thy heart to forget it  
 Making it pleasant for thee to follow  
 thy desire  
 Until that day of lamentation cometh  
 unto thee . . .

There is also the song of the man  
 who is weary of the world :

Death is before me to-day,  
 Like the recovery of a sick man,  
 Like going forth into a garden after  
 sickness.

Death is before me to-day,  
 Like the odour of myrrh,  
 Like sitting under the sail on a windy  
 day.

Death is before me to-day,  
 As a man longs to see his house  
 When he has spent years in captivity.

#### The Gods of the Egyptians

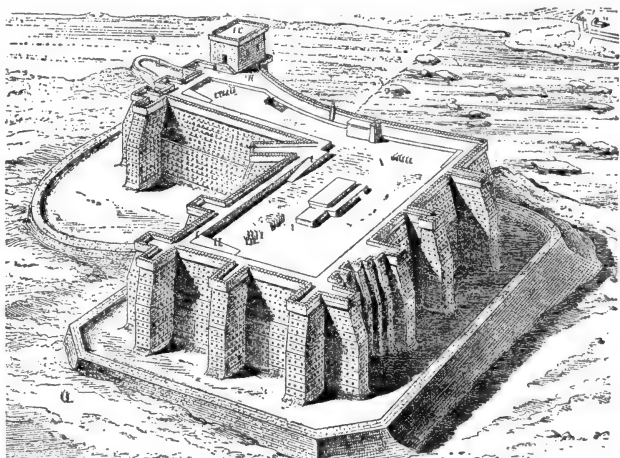
The earliest belief about gods so far as is known, is tribal monotheism, of which traces remain in the early historical writings. Each tribe in the Nile valley seems to have had a separate divinity. As the tribes amalgamated in prehistoric ages, they joined in worshipping two gods, as husband and wife, or father and son, or three gods as a triad. Later, in historic times, when the relationships were already settled, fresh gods were brought in by compounding names, as Ptah-Sokar-Osiris, belonging to three different sources of population. This process was not complete till the XVIIIth dynasty.

Four great classes of gods can be distinguished, the animal gods of the earliest population, the Osiride gods in human form of western origin, the Solar gods of eastern introduction, and the abstract gods, as the Father god, Mother goddess, Creator god, goddess of Truth, etc. All these classes had been mixed in Egypt before the historic times. The belief in passing over a water of death was as old as before the first prehistoric civilization, as the king is said to do so on a float of reeds, whereas boats were usual in the second age. The myths of hunting and killing the gods and feasting on their cooked limbs is older than the Osiris worship, as he is expressly said to have led the Egyptians from cannibalism and violence. From various such indications it is possible to restore several stages in the growth of beliefs long before the date of records that we have. Certainly there was a firmly accepted belief in a ritual for the dead, as from the earliest graves known until historic times the position is always the same, and the funeral offerings do not alter but only increase as time goes on. There must have been a generally accepted ritual for the position of most of

the offerings, which proves settled and continuous beliefs.

In historic times the principal gods were the baboon and the ibis of Hermopolis, lions in some Delta towns, cats at Bubastis, bulls at Memphis, Heliopolis, Kanobos (Canopus), Hermonthis, rams at Mendes and Thebes, crocodiles in the Fayum, hawks at Hierakonpolis and Koptos, serpents at Buto, and several kinds of fish. The principal animal-headed gods were Khnumu the creator and Hershefi, both ram-headed, Bast of Bubastis, Anubis jackal-headed, Thoth ibis-headed, and Horus hawk-headed. The purely human gods were Osiris, Isis, Nebhat, Horus; Amen, Mut and Khonsu

open along the front. The next stage is to have a store chamber at the back, then a way to the roof; after that more chambers and then a roof chamber forming an upper storey. This was no doubt the growth of the superior house also, and as the temple was the house of the god, it is the plan of the temple. In the latest of the temples the old verandah remains as the vestibule hall open in front, the courtyard is the temple court, the store chambers come behind the hall. The peristyle court is an expansion of the verandah around the front court. The hypostyle hall, farther in, is the usual inner hall of the dwelling house. It has also been proved that the course



Egypt. Bird's-eye view of the ancient fortress of Semneh, as restored by Charles Chipiez

From *A History of Art in Ancient Egypt*, G. Perrot and C. Chipiez, by courtesy of Chapman & Hall, Ltd.

the triad of Thebes, and Neit of the Delta. The cosmic gods are Ra the sun, also called Aten, Anher the sky, Sopdu the zodiacal light, Nut heaven, Geb earth, Shu space, Hapi the Nile. The abstract gods were Ptah the Creator, Min the Father, Hathor the Mother, Maat Truth, Sefekh of writing, Nefertum of vegetation.

One great break in the religion must be mentioned, the entire dominance of a scientific worship of the radiant energy of the sun, called the Aten or "lord," to the exclusion of all other gods. This hardly survived the life of its founder, Akhenaten (1383-1365 B.C.).

#### Art and Architecture

The simplest beginnings of architecture are seen in the models of the peasants' huts that were placed on the graves for the spirits. The essential is a verandah with an enclosed court before it, perhaps developed from the Bedawi tent,

of daily worship of the priest was directly copied from the domestic service to a noble.

The great growth of the temples was generally due to successive additions by different kings, as in London the building of Westminster Abbey extended over four or five centuries, although on a single plan. Beside the house temple, just noticed, there were shrine temples, copied from the hut shelters put over the sacred ark of a god; these were open front and back, so that a procession could pass through them to take up the ark or deposit it.

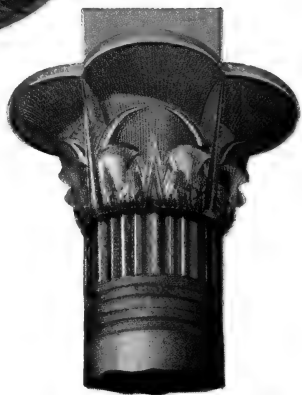
The earlier temples are very simple and plain, but of massive structure. The earliest columns of the pyramid age and the XIIIth dynasty are monoliths of red granite from 16-20 ft. high. The hardness of the granite enabled the spacing to be made wide and airy. When soft sandstone was



Palmiform capital of the Ptolemaic period, from the great temple of Isis, at Philae



Bell-shaped capital from the Hypostyle Hall, at Karnak; diameter at widest, 22 ft.

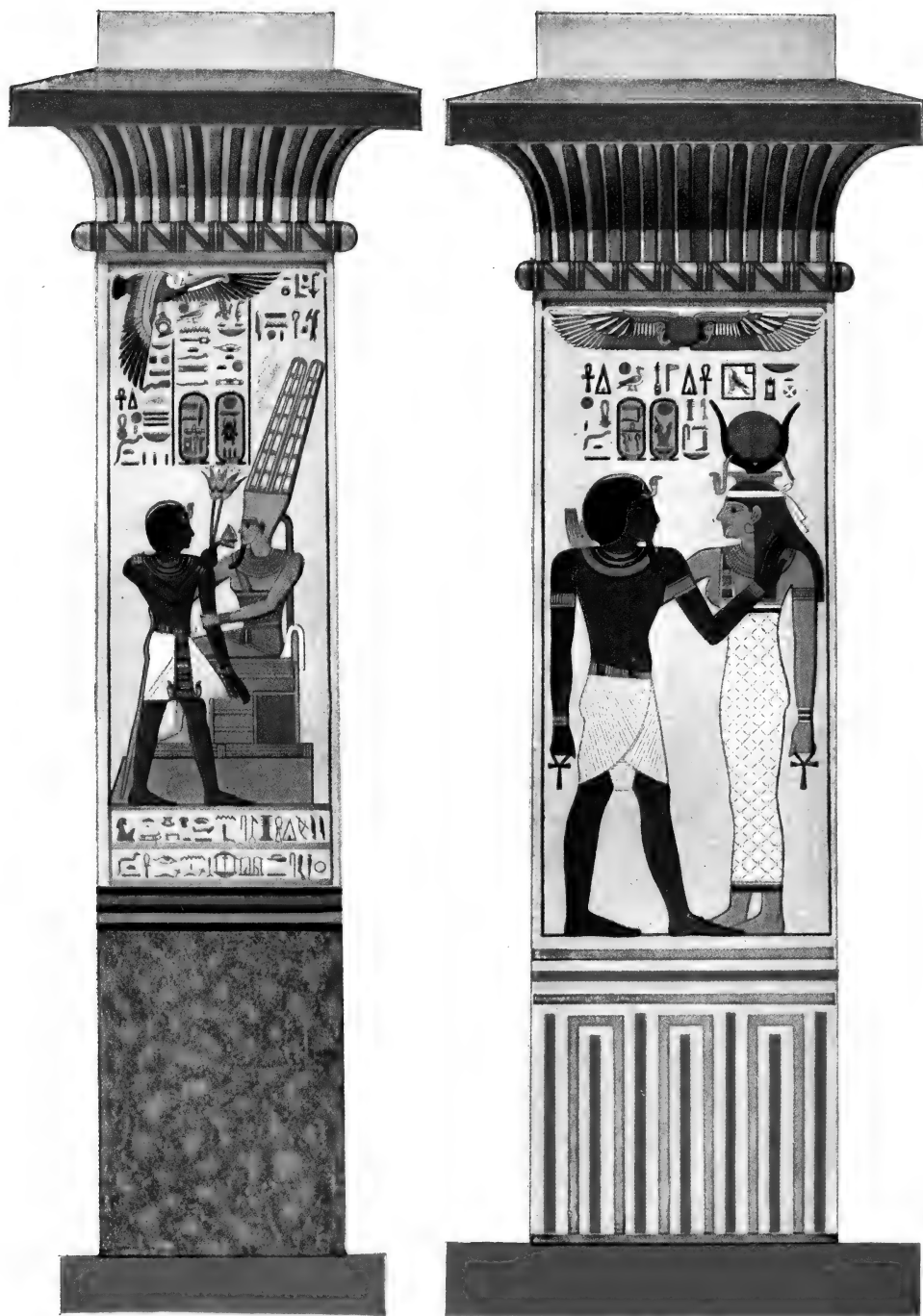


Caulicole capital from Philae, a style which suggested the Corinthian capital to the Greeks



Inscription from the tomb of Merab at Gizeh. Between the two figures of Merab, who, on the left, is accompanied by his mother, are seen subjects carrying baskets of wine, food, etc. The two bottom rows show the chief butcher followed by his assistants bearing a goose and a calf and cutting up an ox

**EGYPTIAN ART: RICH ORNAMENT AND COLOURED INSCRIPTIONS OF AN ANCIENT CIVILIZATION**



Piers, with capitals, belonging to the XVIIIth dynasty, 1700-1600 B.C. The left pier, 17 ft. 6 ins. high, shows Amen on a throne receiving an offering of lotus flowers from Amenhotep II, whose names and titles are inscribed above. On the right pier, 13 ft. 1½ ins. high,

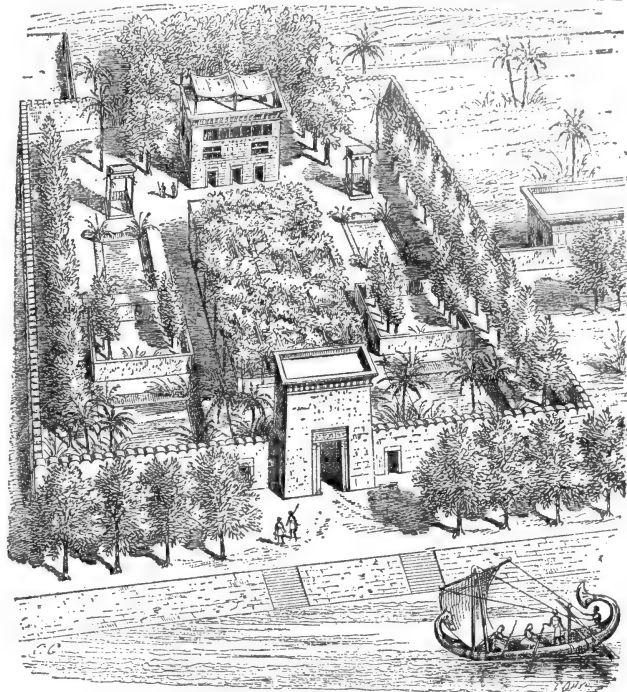
is seen Amenhotep III and the goddess Hathor (Isis), who bears on her head the solar disk resting between two horns and the Uraeus, or serpent emblem. Both figures carry the *ankh* or key of life. Above are the names and titles of the goddess and the king

EGYPTIAN ART: PICTURED PILLARS OF NEARLY 4,000 YEARS AGO

used in the XVIIIth dynasty, and later, the larger temples became choked by the bulky columns required, as at the Great Hall of Karnak. The decoration of the temple with scenes of offering was not for ornament, but in order that the representation should magically be equivalent to the perpetual performance of the successive acts of divine worship. The sculpture in the temples followed the general course of the art.

The complete temples remaining are, of the IVth dynasty, the granite temple at Gizeh; of the XVIIIth, of Hatshepsut at Deir el Bahri, Tehutmes III at Medinet Habu, Tehutmes I to Ptolemies at Karnak, Amenhotep III at Luxor and El Kab; of the XIXth, of Sety I at Abydos, Qurneh, and Redesieh, of Rameses II at Ramesseum, various Nubian and Abu Simbel, of Rameses III at Medinet Habu, Ptolemaic at Edfu and Denderah, Roman at Esneh. Three series of royal tombs are known—the underground brick and timber chambers of the Ist and IInd dynasty at Abydos, the pyramids of the IIIrd—XIIth dynasty at Gizeh and scattered for 40 m. S., the rock-cut chambers of the XVIIIth—XXth dynasty in the tombs of the kings at Thebes; no later king's tomb is known.

More recent excavations, confined chiefly to the Valley of the Kings in the Thebes district, were conducted by the 5th Lord Carnarvon and Howard Carter (*q.v.*). The latter on Nov. 5th, 1922, in almost the last unexplored pieces of ground, made the sensational discovery of the tomb of King



Egypt. Ancient riverside villa, as restored by Charles Chipiez

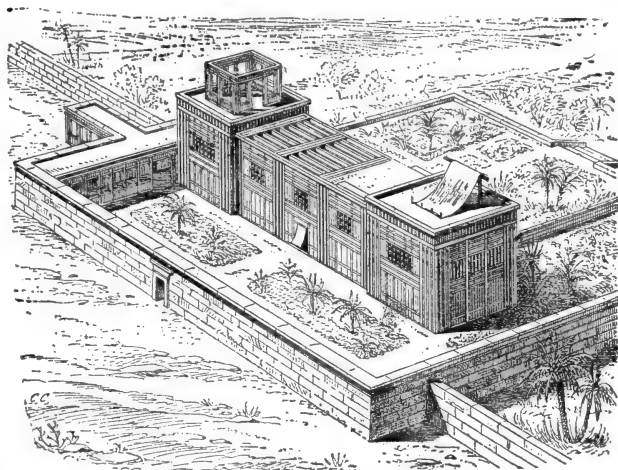
*By courtesy of Chapman & Hall, Ltd.*

Tutankhamen (*q.v.*), and he superintended the removal of the treasures found therein.

The mummies of the kings are preserved from these Theban tombs, but no others. Great cemeteries of private tombs with sculpture and painting are at Gizeh and Sakkarah for the pyramid age, at

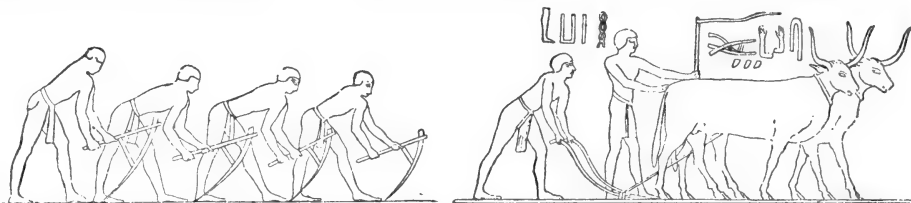
Beni-Hasan for the XIIth dynasty, and at Thebes for the XVIIIth—XXth dynasties. Forts of massive brick enclosures, with panelled pattern outside, are of the IInd dynasty at Abydos, and of the XIth dynasty in Nubia. Temples were often fortified with immense walls, as that 80 ft. thick at Tanis. The only complete plan of a town is of the XIIth dynasty; it has many large mansions of 60 rooms and rows of streets of workmen's houses, all laid out in a regular plan. The houses and the earlier temples were built of mud brick, which was covered with lime-wash or stucco, on which fresco painting was placed in the better houses; the early brick temples were sometimes lined with glazed tiling of large size.

Statuary is known from the Ist dynasty onward. It begins in limestone and ivory, with an entirely naturalistic style, full of character and life, and superior to later work in its truth and absence of convention. A copper statue is recorded in the IInd dynasty, and a large copper statue has been found of the VIth dynasty. Diorite and other hard rocks were also sculptured. In the XIIth dynasty the style was more finished and delicate, but less living. The XVIIIth dynasty had more vivacity, but



Egypt. Reconstruction of a wooden building, made from imitations of assembled wooden construction found in tombs

*By courtesy of Chapman & Hall, Ltd.*



**Egypt. Agriculture as depicted on ancient monuments. Left, four men hoeing, from Beni-Hasan ; right, a ploughing scene, from the necropolis at Memphis**

*By courtesy of Chapman & Hall, Ltd.*

generally less able work ; hard rocks were mostly used, and many colossal statues were carved, ranging to 900 and even 1,200 tons weight. Though work declined in the XIXth dynasty and onward, there was a revival in the XXVth and a modification by Greek influence after that ; but there is no sculpture of merit after Alexander.

Metal work—mostly in copper—was skilfully wrought. Large vessels were made by hammer work, often figured in the tomb sculptures ; a narrow-necked flask of copper is only 1-40th in. thick. The casting, a thin form of copper in place of a wax model, was carried on from the IIInd dynasty ; for figures a core was made of ash and clay, a thin coat of wax was put over it and finely tooled, an outer mould was placed around that, the wax melted out, and copper or bronze run in. The metal is often not more than 1-50th in. thick. A ring handle playing loose in its ring attachment were cast all in one. Spinning thin metal bowls in a lathe was perfectly done in the XIXth dynasty.

Jewelry was delicately made as early as the prehistoric, when minute beads of gold, and thin gold worked over a core of limestone, are found. In the Ist dynasty gold was perfectly soldered, and in the XIth dynasty there was the most delicate work of soldering cloisons of gold on an open-work basis, and inlaying with hundreds of minutely cut pieces of coloured stones—turquoise, lazuli, and cornelian. No later jewelry

exceeded this in beauty and delicacy, though the same style was maintained till Greek times. Granulated work was finely made in the XIIth dynasty ; minute globules of gold in close rows were soldered on curved surfaces in regular patterns with perfect precision. In the XVIIIth dynasty there was less delicacy, and the favourite process was the inlaying of one metal in another to form figures and scenes.



**Egypt. Harvest scene, as shown on a tomb at Gizeh**

In the XXVth—XXXth dynasties this inlaying of gold thread in bronze was carried out so as to clothe the statues completely with designs copied from embroidery.

Glazing was known from the beginning of the prehistoric civilization, and used to cover both faience and stone. Vases with two-colour glazing were made in the Ist dynasty, and tiles of many colours in the IIIrd dynasty. The great development of glazing in many colours was in the XVIIIth, for tiles, inlay of walls, vases, dress ornaments, and cheap jewelry. Innumerable statuettes were made of glazed ware, often with minute detail of features, especially in the XXVIth dynasty. Glass was brought in rarely in the second pre-

historic age, Ist and XIIth dynasties, from some unknown source. The great output of it in Egypt was after the Syrian craftsmen were brought in during the XVIIIth dynasty. Then there was an immense output of coloured glass vases, beads, and other work. This was revived in the Ptolemaic and Roman times as minute inlay or mosaic work of the greatest delicacy. Blown glass vessels were

not known till late in the Greek or Roman period. Alexandria was the main home of fine glass work in classical times, until superseded by Venice after the

Arab invasion. Painted glass lamps were the form of this craft which was maintained by the Arabs. The fine work of furniture, gilding, stucco, weaving, and other kinds cannot be well described here ; but the Egyptian was for thousands of years the most skilful craftsman of the world.

**W. M. Flinders Petrie**

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**Egypt. Everyday scenes depicted in inscriptions. 1. Milking, from a tomb at Sakkarah. 2. Corn-grinding, figure from Boulak. 3. Scribe registering the weighing of merchandise from Sakkarah**

*By courtesy of Chapman & Hall, Ltd.*

Breasted, 5 vols. 1906-7; *The Arts and Crafts of Ancient Egypt*, W. M. F. Petrie, 1909; *A History of Egypt from the Earliest Times to the Persian Conquest*, J. H. Breasted, 2nd ed., 1909; *Guide to the Antiquities of Upper Egypt from Abydos to the Sudan Frontier*, A. E. P. B. Weigall, 1910; *The Dawn of Civilisation: Egypt and Chaldaea*, G. Maspero, Eng. trans., 5th ed. repr. 1910; *The Struggle of the Nations: Egypt, Syria and Assyria*, G. Maspero, Eng. trans., M. L. McClure, 2nd ed. 1910; *The Passing of the Empires*, 850 B.C.-330 B.C., G. Maspero, Eng. trans., 1900; *Egypt and Israel*, W. M. F. Petrie, 1911; *The Revolutions of Civilisation*, W. M. F. Petrie, 1911; *Development of Religion and Thought in Ancient Egypt*, J. H. Breasted, 1912; *Manual of Egyptian Archaeology*, G. Maspero, 6th Eng. ed. A. S. Johns, 1914; *Elementary Egyptian Grammar*, M. A. Murray, 3rd ed. 1914.

**MODERN EGYPT.** The main physical features of Egypt are the Nile and the desert. Egypt is bounded N. by the Mediterranean, S. by the Anglo-Egyptian Sudan, E. by the Red Sea, and W. by Tripoli and the Libyan desert. The area of the country is roughly 350,000 sq. m., of which all but a fifteenth is desert. A division is made between Lower, Middle, and

hills. The valley lands in this region are well cultivated.

The chief towns are Cairo, the capital; Alexandria, the chief seaport; and Port Said. The coastline is over 600 m. on the Mediterranean, and about 1,200 m. on the Red Sea. Part of it is rocky, but nowhere do the cliffs exceed a height of 1,000 ft.

The Nile enters Egypt proper at Halfa, just N. of the second cataract, flowing through a narrow valley as far as 25° north.

The delta extends some 100 m. S. to N., and 155 m. on the shore of the Mediterranean between

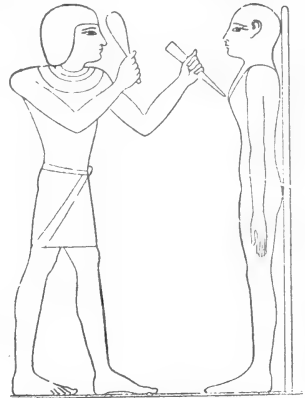


Egypt. Artists at work on a statue, from an inscription at Thebes

Alexandria on the W. and Port Said on the E. The surrounding land, southwards, is watered by a network of canals and the two branches of the Nile, Damietta and Rosetta. The lakes of the delta, Mariut, Edku, Burlus and Menzala are all shallow, the water being salt or brackish. Lake Menzala (780 sq. m.) is the largest.

The desert plateaux extend on either side of the Nile valley from the S. borders of the delta in the N. The E. area, the Arabian desert, between the Nile and the Red sea, varies between 90 m. and 350 m. in width. To the W. the Sahara extends unbroken for many hundreds of miles. The great oases, Siwa, Baharia, Farafra, Dakhla and Kharga, in the western desert, receive water from a sandstone bed about 400 ft. below the surface.

The flora of Egypt is scanty, the country being barren of woods or forests. The growth of most importance is the date palm, of which there are some 30 varieties all over the country. Other trees are the orange, clove, lemon, mulberry and pomegranate. Sycamore, tamarisk and milk trees are in evidence. Grapes are largely found in the Farafra. Egypt also grows limes, bananas, melons, prickly pears or Indian figs, and olives.



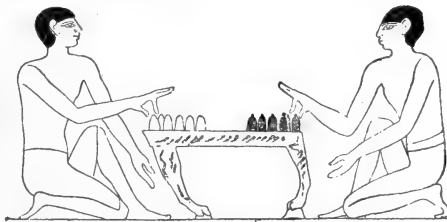
Egypt. Sculptor at work, from an inscription at Thebes

Of animals, the camel, ass, sheep and buffalo are most used. The horse is not so much in evidence. Among the wild animals of Egypt are the hyena and gazelle, while the hare, fox, and jackal are often found in the desert, and the lynx, ibex, and bats in the desert in the Nile valley. Reptiles include the horned viper, the echis, and the hooded snake. Lizards are numerous; so are spiders, beetles, fleas, mosquitoes, and scorpions; locusts are not so common. Fish are plentiful. Over 300 species of birds are found.

Egypt is virtually a rainless country. The annual rainfall in Alexandria, and on the Mediterranean coast of Egypt, does not exceed 8 ins. Southwards rain is very irregular. The mean temperature at Port Said and Alexandria varies between 57° F. in January and 81° F. in July. At Cairo it is 53° F. in January, and 84° F. in July. The temperature is high by day and falls quickly at night.

**PEOPLE AND LANGUAGE.** The population of the country is 12,750,918, showing a remarkable increase since the beginning of the Turkish occupation, when an estimate gave it as less than 2,500,000. Of the present population 11,658,148 are Mahomedans.

The most interesting type is the fellah or peasant; the most picturesque, the Beduin. The fellah has been often described as the backbone of the country. Tall, thin, and wiry, he reveals by his sad and weary aspect the tale of the last centuries. To the nomad Arab the term fellah signifies humility and even contempt. The fellah leads a life of extreme simplicity; a *galabieh*, or blue cotton frock, and a turban comprise his wardrobe; his fare consists of millet bread and raw vegetables.



Egypt. Ancient representation of a table game, from an inscription at Beni-Hasan

Upper Egypt. Lower Egypt is the northern part—the delta of the Nile; Middle Egypt is the land between Cairo and Assuan, and Upper Egypt is the southern part—the middle Nile valley. The fertile portions of the country are mostly around the delta, the Nile valley and the oases. With the continual improvement in drainage and irrigation the cultivable area is yearly increasing.

The majority of the population of 12,750,918 are fellahen (agriculturists), and depend upon the resources of the Nile. Egypt's river has conquered the desert and by its annual overflowing has deposited much sediment, which it carries from the Abyssinian mountains through the Atbara and Blue Nile, converting sandy land into cultivable areas. In Upper Egypt the Nile valley is narrower and the desert on either side is bounded by





Egypt. Ancient divinities represented in Egyptian sculpture. 1. Horus, hawk-headed god of day. 2. Thoth, god of wisdom. 3. Ptah, the creator, chief god of Memphis. 4. Osiris, god of the underworld. 5. Bast, goddess of Bubastis

By courtesy of Chapman & Hall, Ltd.

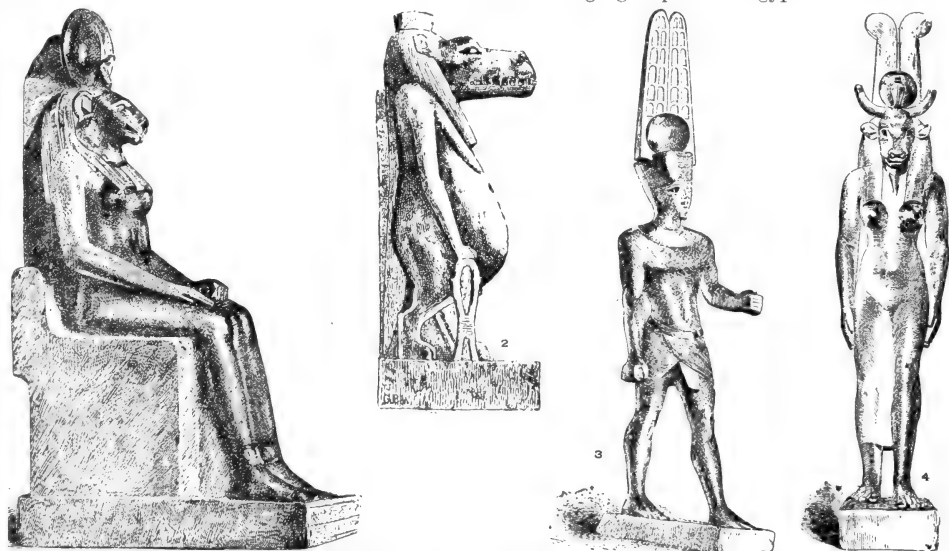
The Beduin presents a brighter picture. These "people of the tent" are shepherds and herdsmen of sturdy but somewhat undersized stature, with coarse, thick, black hair, and well-chiselled features. The Nubians, or Berberins, dwell in Upper Egypt, and are of mixed negro and Arab blood. The majority are peasants. The Copt is the native Christian of Egypt, and is usually of a studious or commercial type. According to the latest census the Coptic Orthodox Church numbers 854,778 followers.

The women of Egypt have been described as models of beauty in body and limbs between the ages of fourteen and twenty, but few retain either good looks or fine physique beyond the age of forty. Many women of the upper classes are rapidly becoming Europeanised in both dress and habits. The maidens of Egypt marry at an early age, generally between ten and sixteen. Divorce is of a facile order. If the husband repeats the words "Thou art divorced" three times the divorce is a *fait accompli*.

Arabic is the universal language

of Egypt. Turkish is rarely spoken, and until recently French was used by the better educated Egyptians. The English language, however, is coming into greater use. The literary record is scattered, since Arabic is also the language employed by other Eastern countries. After the fall of Bagdad, Cairo sprang into prominence as the chief literary centre of the Islamic world, and to the present day it retains this distinction through its university of Al Azhar.

**HISTORY.** The Turkish conquest of Egypt in 1517 effected



Egypt. Ancient deities. 1. Sekhet, goddess of war. 2. Tounaris, or Opet, goddess of childbirth. 3. Amen, or Ammon, the sun god worshipped at Thebes. 4. Hathor, goddess of love, mirth, and social joy

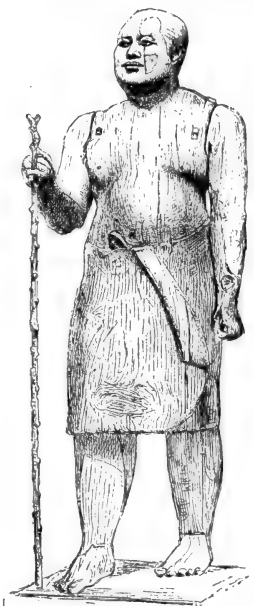
By courtesy of Chapman & Hall, Ltd.

little change in the administration of the country. The apathy of its Turkish rulers led to a long period of unrest, which culminated in 1609 in a mutiny among the Turkish army of occupation. The rebellion, however, was curbed in Feb., 1610, by the governor, Mahomed Pasha. Risings among the Egyptians and the Turkish soldiers, plagues, pestilence, and famine mark subsequent years. Disease in the spring of 1619 carried off 635,000 persons, and similar ravages in 1643 completely wiped out 230 villages.

This rather doleful and somewhat obscure period of Egyptian history offered little opportunity for a great man, although in the next century Ali Bey appears to have succeeded in introducing a measure of order and reform. By stern methods he suppressed the notorious outlawry of the Beduin in Lower Egypt. In 1768 Ali declared the independence of Egypt, and was afterwards given the title of sultan. Turkey, however, defeated Ali in 1773, and much the same dismal state of things that existed during the previous Turkish occupation was re-established. A new epoch, however, opened with the short-lived conquest of Egypt by Napoleon. Insurrection broke out and after war with Turkey, in which the British intervened by landing a force in 1801, Napoleon evacuated the country. Turkey now concentrated her attention against the Mamelukes, and by treachery and massacre overcame this troublesome but brave band. The chief personage of this, the darkest period of Egyptian history, was Mehemed Ali, who in so far as massacres were concerned showed no disposition to depart from the rule of his predecessors, but nevertheless promoted several sound projects.

#### European Intervention

The financial chaos which characterised Egypt during this period reached a climax in 1876, when the khedive suspended payment of his treasury bills. The debt of Egypt was now £91,000,000. Corruption and maladministration generally were rife, and ultimately France, Italy, and Austria each nominated representatives on the commission of public debt which had been promulgated by khedival decree. Great Britain was unwilling to interfere, although she was invited by the khedive to nominate a British Commissioner, and eventually this position was offered to Lord Cromer, then Sir Evelyn Baring. Financial affairs after this European intervention improved. But a political storm was brewing.



Egypt. The Sheikh-el-Beled. Wooden figure from Boulak

By courtesy of Chapman & Hall, Ltd.

In 1879 Nubar Pasha, minister of public works, and Sir C. Rivers Wilson, the minister of finance, were assaulted by a crowd of Egyptian officers. Ahmed Arabi, an Egyptian of humble origin who had risen to be colonel of the 4th regiment, led a successful revolt of the army, and compelled the khedive to change his ministers. The country at this time had come virtually under the direction of

Arabi's party, and disturbances rendered foreign intervention necessary. Arabi's challenge by raising batteries at Alexandria with the intention of using them against the British fleet was followed by the bombardment of these batteries by the British. At Tel-el-Kebir Arabi's army was defeated and eventually surrendered. Even now the British government declined to remain in Egypt; its declared object was to establish order and stability.

#### Trouble in the Sudan

One of the difficulties of the British reformers was the trouble in the Sudan. In 1883 the Egyptian army, under the command of General Hicks, which had been sent by the British Government to restore order in the more distant regions of the Sudan, was annihilated in Kordofan. The British government, reluctant to associate itself with any military enterprise in that direction, decided to abandon the Sudan and withdraw all the garrisons. In the meantime, however, Mahomed Ahmed, a religious fanatic known as the Mahdi, had risen to power. General Gordon, who was sent to report on the military situation and on the means necessary in order to accomplish the evacuation, arrived at Khartum and was killed by the Mahdi's troops in 1885. A relief expedition was sent but arrived too late. Sir Herbert Kitchener, sirdar of the Egyptian army, recaptured Khartum on Sept. 2, 1898.

The more settled state in the Sudan helped directly in the progress of Egypt, and a variety of reforms were instituted; harsh



Egypt. Ancient sculptured figures of pyramid times from the Boulak Museum. Left, Ra-Hotep, an Egyptian prince; right, the princess Nefert, or Nefert, limestone figure

By courtesy of Chapman & Hall, Ltd.



Egypt. Restoration of the gate of the temple of Khonsu at Karnak, part of Thebes, on the right bank of the Nile

taxes were abolished, and the problems of drainage and irrigation were being solved. The contract for the construction of the Nile reservoirs was signed in 1898; post-office savings' banks were introduced in 1900; navigation dues on the Nile were abolished, and the Anglo-French Convention was signed in 1904.

In 1907 Lord Cromer's work in Egypt came to a close, the country then experiencing an era of peace and prosperity unprecedented in its history. He was succeeded by Sir Eldon Gorst, but after a short régime, during which time a group of political agitators took advantage of the friendly attitude of the new British agent, Sir Eldon broke down in health, and in 1911 Viscount Kitchener of Khartum was appointed. Lord Kitchener's efforts were directed towards increasing the water supply of Egypt by means of barrages and reservoirs; he also built roads, and succeeded in pacifying various religious and political factions. He devoted much attention to the interest of the fellah, and established cotton markets throughout the country which provided means of insuring the ignorant peasant against dishonest traders; another measure of interest to the small-

holder was the Five Feddans Law, which prohibited the agricultural holdings of farmers who did not own more than five acres of land from being seized for debt.

The relationship between Lord Kitchener and the khedive was always strained, for it was known the khedive Abbas was not amicably inclined towards the British. In Dec., 1914, Abbas II was deposed and Prince Hussein, his uncle, succeeded him with the title of sultan of Egypt; at the same time Great Britain declared the Turkish suzerainty at an end, and a British protectorate was declared. Hussein died Oct. 9, 1917, and was succeeded by his youngest brother, Prince Ahmed Fuad.

#### Egypt during the Great War

During 1914-16 Egypt was on the whole prosperous and quiet, although when Turkey entered the war the country was overrun by spies and secret agents in the pay of Germany.

Martial law was proclaimed, as a measure of precaution, but the British were able to use the Egyptian army freely for policing the frontiers of the Sudan, and in the reconquest of Darfur. Egypt rendered great assistance by its labour corps, camel transport, and other services. The entry of the

Egyptian Expeditionary Force into Palestine in 1916 removed all danger of hostile invasion.

In 1919 a group of nationalists advocated a degree of complete autonomy which would leave Great Britain only the right of supervision with regard to public debt and facilities for shipping on the Suez Canal. They elected a committee which carried on an unceasing agitation throughout the country. They asked to be allowed to send a deputation to London, but the British government replied that, while sympathising with the idea of giving Egypt an ever-increasing share in the government of the country, they could not abandon their responsibility for good order and good government, and refused to allow the nationalist leaders to proceed to London to put forward their demands. Early in March four prominent nationalists were deported to Malta for conducting an anti-British agitation, among whom was Said Zaghlul Pasha, leader of the nationalists in the legislative assembly.

#### Disturbances in 1919

About this time Hussein Rushdi Pasha, who had been prime minister since April, 1914, resigned, and serious events followed quickly. The Egyptian nationalists demanded the immediate release of their leaders. Grave riots and disturbances broke out, and Lord Allenby was appointed special high commissioner for Egypt and the Sudan.

The unrest was general from Assiut in Upper Egypt down to Alexandria, and students were prominent among the rioters.

On March 14, 1919, the mob rushed the station at Galiub (N. of Cairo), attacked trains and British officers, and murdered soldiers, while disturbances also broke out at Zagazig. In Cairo and Alexandria collisions took place between the rioters and patrols. At Cairo a patrol fired on the mob, killing and wounding several, and on March 15 a British officer was murdered at Minia in Middle Egypt.

On March 17 serious disturbances took place at Damanhour, while at Alexandria a procession of workmen and students came into collision with the troops. Between Birket el Saab and Cairo several stations were destroyed. A leading event in this month was Gen. Bullfin's warning to the notables, whom he summoned to a meeting, of the serious consequences of the prevailing grave outrages, and his warning to the inhabitants of the Fayum and Upper Egypt that if further shootings of British soldiers by Beduins occurred repressive measures would immediately follow.

All through April the unrest continued. On the 9th a new ministry under Hussein Rushdi Pasha was formed, while about the same time the four arrested nationalists were released on Allenby's order, and an inquiry into the causes of the disturbances instituted. Up to July 21 the casualties in the various riots were 800 killed and 1,500 wounded.

The autumn of 1919 saw a recrudescence of rioting. On Oct. 25 a serious outbreak occurred in the native maritime quarters of Alexandria, when troops had to fire on the rioters. In both Cairo and Alexandria outbreaks occurred on Nov. 15. In Dec. excitement was caused by the El Azhar incident. British soldiers, irritated by being stoned by students from within the El Azhar University, Cairo, followed their assailants inside. The authorities of the university regarded this as a grave insult and protested strongly to Allenby, who replied there had been no intention to pollute the sanctity of the mosque, and expressed regret for the incident. During this time it had been found impossible to form a stable ministry, one after another having resigned in despair.

Realizing that reforms were imperative, the British Government at the end of 1919 sent out a mission under the colonial secretary, Viscount Milner, to inquire into the matter. This reached Alexandria in Dec. and was in the country about six months. On its return certain proposals were laid before the Cabinet, while the nationalist

leader, Said Zaghlul, arrived in London in June, 1920, to discuss the question of the future of Egypt with Lord Milner and his colleagues.

In Oct., 1920, although the result of the negotiations between the Egyptian nationalist delegation in London and Lord Milner's commission had not been officially announced, an outline of the agreement was published in the press. It was stated that the new constitutional reforms would go a long way towards meeting the grievances of the people of Egypt. These negotiations were continued early in 1922 and the British government on Feb. 28th, 1922, declared Egypt an independent state. The Sultan Ahmed Fuad Pasha was proclaimed king as Fuad I on Mar. 16th, and his first cabinet took office with Sarwat Pasha as premier.

#### Egyptian Independence

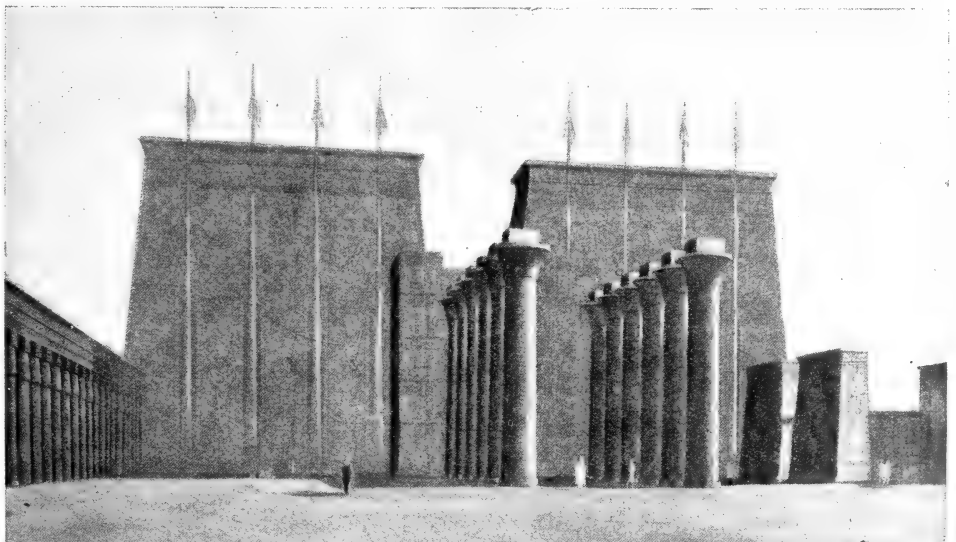
The fundamental points in the agreement were: Great Britain was to recognize the independence of Egypt, and guarantee its integrity against outside aggression, in return for which Egypt was to recognize Great Britain's privileged position in the valley of the Nile; Great Britain was to maintain a garrison only in the canal zone; Egypt was to have control of her foreign affairs, provided she did not make treaties at variance with British policy; the capitulations were to be done away with and the veto on legislation affecting foreigners to be vested in the high commissioner: two British officers were

to look after the public debt commission and legislation affecting foreigners. The final agreement was to be submitted for confirmation to the British parliament and the Egyptian national assembly. It amounted to a grant of independence to Egypt, subject to British control over its foreign policy, with provisions for safeguarding British and other interests in the country's debt and in the Suez Canal.

#### CONSTITUTION AND GOVERNMENT.

Before 1913 the affairs of Egypt were controlled by two public bodies known as the legislative council and the general assembly. These bodies dated from 1882 and were in the main consultative only, legislation being in the hands of the khedive and his ministers. In 1913 important constitutional changes were introduced. The council and assembly were replaced by a new body called the legislative assembly. This consisted of 66 members elected by the people, but by an indirect vote, the ministers and 17 nominated members. Early in 1923 a new constitution providing for a reformed electoral system, including cabinet responsibility to Parliament, was drawn up. It was signed by King Fuad on April 19th, 1923. It substituted a democratic for an autocratic government and abolished the legislative assembly in favour of two chambers of parliament.

**JUSTICE AND EDUCATION.** One of the main foundations of justice in Egypt is the capitulations. They



**Egypt.** Restoration of the great temple of Amen-Ra or Ammon at Karnak, Thebes, viewed from within and showing the vast pyramidal towers which served defensive purposes

were introduced in order to protect foreign merchants and encourage commerce, but involved a multiplicity of judicial systems. Two referred to Egyptians, one to foreigners only, and another to foreigners and natives. Moreover, the capitulations offered relief to criminals of all shades, since foreigners were free from the jurisdiction of the native courts. The judicial system has been universally denounced, and has undergone constant and considerable modifications. The native courts have both native and foreign judges. The courts of summary jurisdiction are presided over by one judge, and there are central tribunals with three judges. There is a court of appeal at Cairo. Criminal prosecutions are entrusted to a *procureur-général*, whose representatives are attached to each tribunal. There are special children's courts. The police service is under the administration of the ministry of the interior.

#### Native Education

Under the ministry of public instruction, education in Egypt has made strides within recent years. The natives are educated in *kuttab*s, schools attached to mosques. Some of these native schools are under the ministry. Here, in addition to instruction in the Koran, the pupils are given an elementary secular education. There are over 1,000 of these *kuttab*s attended by more than 25,000 pupils. There is also a grant-in-aid system. Such grant is made to other schools where no other language but Arabic is taught, and where a good standard of education is maintained. The number of scholars in these schools rose from 7,536 in 1898, at which date the grant-in-aid system began, to 218,184 in 1919. There are also secondary schools and colleges where training for the various professions is given, these including law, medicine, engineering, accountancy, agriculture, etc.

**INDUSTRY.** The Egyptian is an agriculturist. Ancient Egypt was the granary of the Roman world, and exported great quantities of corn. With the coming of the Turks a different order of things was created, and a long period of depression and misery followed. The revival of Egyptian industry began with the elimination of the Turk by the British. Vast schemes of irrigation and drainage were being developed when the Great War broke out. With the improvement of the Assuan dam in 1913 a further considerable area of the Nile valley came under cultivation, with the result that the total cultivable area of Egypt proper

was reckoned in 1918 at 7,820,801 feddans, or a little over 8,000,000 acres. This makes an interesting comparison with the figures given at the time of the French occupation in 1798, when it was found that the cultivable area totalled 3,520,000 acres.

Egypt, as the first sultan of Egypt said, has three assets—the Nile, the Egyptian sun, and the fellah. Very full use is made of both the sun and the Nile by the fellah. The sun shines all through the year, and the Nile is stored up so as to be available in any season. In addition, the fellah is extremely hard-working, and it is towards helping him in making the fullest use of the Nile that British brains and science have been directed. In the past the fellah had to wait upon the flood-tides. Nowadays, instead of obtaining water for his land for only a portion of the year, he obtains a regular and sufficient supply all the year round. In other words, the whole system of irrigation is being gradually directed towards perennial irrigation—thus assuring two and often three crops every year.

Where perennial irrigation is impossible, the basin system has been adopted, whereby water is stored in August and is kept in reserve till October, when it begins to be used. The basin system is the oldest system of irrigation known to Egypt. Only one crop a year can be grown from it.

Another system is used on the high lands near the Nile. These lands cannot be reached through canals, so a system of pumping the water is utilised. The British use of steam-pumps has been largely developed, several thousands being in use. The water-wheel, worked by buffaloes, or the water-lift (*shaduf*), worked by hand, is still in favour with the conservative fellahs. Over 100,000 of these water-wheels and water-lifts are in use. There are three agricultural seasons. Cotton, sugar, rice, and, in a lesser degree, millet and vegetables, are grown in summer; wheat, barley, flax, and vegetables in winter. Maize, millet, and flood rice are grown between August and November—the *Nili* period.

#### Cotton Production

Egypt has also a future in other directions. Such industries as oil and tobacco are being developed. There are gold-mines in the eastern desert.

The present prosperity of the country, however, is due mainly to cotton, which represents over three-quarters of the total value of Egyptian exports. It is estimated that the present total output of

this commodity is 7,500,000 kantars. Considerable trade is done with Manchester, and altogether Great Britain purchases more than half of Egypt's total production. The progress of Egyptian trade can be seen by the increase in her exports from £19,000,000 in 1882 to £59,495,417 in 1919. Her raw cotton export in 1918 alone was £38,034,467. Egypt exports chiefly raw cotton, cotton seed, sugar, beans, cigarettes, onions, rice, and gum-arabic—which come from the Sudan. Other exports are eggs, hides and skins, wool, quails, lentils, wheat, and dates. Sugar is another highly important commodity. Egypt's imports are confined to such manufactured articles as cotton goods and other textiles, coal, iron and steel, timber, tobacco from Turkey and Greece, machinery, flour, alcoholic liquors, petroleum, fruit, coffee, and live animals.

#### Trade Routes

The lines of commercial communication to Egypt are, by virtue of the country's geographical position, the most important in the world. Besides being a distributing centre for the Levant, it holds a commanding position on the trade routes from Europe to the East. By the completion of the Suez Canal in 1869, a direct sea route was opened up between the Mediterranean and the Red Sea. Considerable use is made of the ports of Alexandria and Port Said by foreign steamship companies—among which the Germans were pre-eminent. Passenger traffic is at its height in the winter when there is an influx of tourists seeking pleasure or health. The rly. system forms the northern section of the Cape to Cairo scheme; the main line follows the Nile to Shellal, S. of Assuan. See N V

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**Egypt**, NATIONAL BANK OF Egyptian bank established in 1898. Its head offices are at Cairo, and there are branches at Alexandria and elsewhere in Egypt; also at Khartum and other places in the Sudan. It has the exclusive right of issuing notes in Egypt. The capital is £3,000,000, and the London offices are at 6 and 7, King William Street, E.C.

**Egypt Exploration Society.** Society founded in London, 1882, for exploring ancient sites in Egypt. The society has excavated Pithom, Tanis, Naucratis, Tahpanhes, Bubastis, Dendera, and other sites, besides its exhaustive operations at Deir-el-Bahri and Abydos. The archaeological survey branch, founded 1890, has reproduced wall-paintings and reliefs in rock-cut tombs at Beni Hasan, el-Bersheh and el-Amarna, in mastabas at Sak-kara, and elsewhere. The Graeco-Roman branch, founded 1897, publishes texts and translations of papyri. From Oxyrhynchus 1,600 were so dealt with by 1916, besides the Tebtunis and Hibeh finds. The offices are 37, Great Russell St., London, W.C. See Archaeology; Egypt; Egyptology.

**Egyptian Blue.** Colouring matter used by the Romans in the early centuries of the Christian era. It is seen in several early frescoes in the Vatican and at Pompeii. Fouqué, a French chemist, showed that it consists of a double silicate of calcium and copper, and on account of its permanence urged that its manufacture should be resumed.

**Egyptian Hall.** London place of amusement, 1812-1904. Situated at 171, Piccadilly, W., between St. James's Street and Duke Street, it was built in 1812 by G. F. Robinson, for the natural history collections of William Bullock, F.S.A., dispersed in 1819. Here were exhibited the Living Skeleton (Claude Amboise Seurat), in 1825, and the Siamese Twins, in 1829. B. R. Haydon, in 1846, complained that while in one week "Tom Thumb" (C. S. Stratton) attracted 12,000 people, his own picture exhibition drew 133½—the ½ being a little girl. Later the hall was a centre for such entertainments as those of Albert Smith, Artemus Ward, and "Mrs. Brown." From May, 1873, until Christmas, 1904, when he removed to St. George's Hall, in Langham Place, J. N. Maskelyne made it "England's Home of Mystery." For many years the exhibitions of the Dudley Gallery Art Society were held here. The figures of Isis and Osiris at the entrance were by Gahagan. The name is preserved in the block of business premises known as Egyptian House.

## Egyptology.

Study of the antiquities of Egypt. It is concerned not only with the material remains, but also with religion, history, language, art and social life, although the remains are the main sources of knowledge.

Excavation of the buried treasures of Egypt was begun in the 18th century, but was carried on in a very desultory fashion and mainly for the purposes of curiosity and gain. However, as gradually their richness and extent were revealed, a highly specialised branch of study came into existence. Archaeologists accompanied Napoleon on his expedition to Egypt in 1798, and soon after this the first experts in Egyptology appeared, of whom Champollion was, perhaps, the greatest. Another was Lepsius, who had charge of an important expedition sent by the Prussian government to excavate in Egypt in 1842-45, about which period the word Egyptology came into use. In 1858, to protect their treasures from acquisitive foreigners, and from Arab spoliation, the authorities in Egypt set up, under Mariette, a special department to which a museum was attached, the work of which has grown greatly in recent years.

The modern scientific treatment of Egyptian antiquities dates from about 1880, and is associated specially with Gaston Maspero and Flinders Petrie. To provide funds for this work, an Egypt Exploration Fund was started in Great Britain; 15 years later an independent Egyptian Research Account was established, and out of the latter a British School of Archaeology arose in 1896. France has a similar society, and work has also been done by various universities and other learned societies. Egyptology is now a recognized subject of study, in which several universities, among them Oxford, Liverpool and London, provide instruction. See Archaeology; Egypt.

**Ehrenbreitstein.** Town of Germany. It stands on the right bank of the Rhine, opposite Coblenz, with which it is connected by bridges. Its industries include a trade in wine. Until 1918 it was one of Germany's strongest fortresses, a rock overlooking the Rhine and the Moselle being the centre of the system of fortifica-



**Ehrenbreitstein.** The great fortress opposite Coblenz, seen from the left bank of the Rhine

tions. Once a Roman station, the town was part of the electorate of Treves, to whose electors its earlier fortifications were due. Owing to its strategic situation it was often attacked and sometimes taken by the French. It became part of Prussia at the settlement of 1815 and was made into a modern fortress after 1870. Pop. 5,500.

**Ehrlich, PAUL** (b. 1854). German physiologist. Born at Strehlen, Silesia, March 14, 1854, his prolonged experimental researches brought him world-wide renown, and in 1908 he shared with Metchnikoff the Nobel prize for physiology and medicine.



**Paul Ehrlich,** German physiologist. In 1899 he became director of the Speyer Institute of experimental therapeutics at Frankfurt, which he made famous by his laboratory work in connexion with cancer. The founder of chemo-therapy, Ehrlich also laboured to discover a safe and effective cure for syphilis, being latterly assisted by a Japanese doctor named Hata. When Hata joined him Ehrlich had already tried 418 combinations of arsenic, and it was not until 606 experiments had been made that any real success was in sight. Even this formula was admittedly imperfect and dangerous in practice, and further experiments were necessary. But it was Ehrlich who did most of the spade work.

**Eibar.** Manufacturing town of Spain, in the prov. of Guipúzcoa. It is 39 m. by rly. W. of San Sebastian, makes guns, swords, etc., and is noted for its damascened arms and other metal ware. Pop. 9,659.

**Eichendorff, JOSEPH, FREIHERR VON** (1788-1857). German poet and novelist. He was born at Lubowitz, March 10, 1788, near Ratibor,



Silesia, a member of a noble Catholic family. He published his first romantic novel, *Ahnung und Gegenwart*, in 1815, but is better remembered as a poet, his simple nature lyrics having taken their place in German popular song. He served against France, 1813-15, and from 1820-44 occupied various public appointments, and in his later years was distinguished as a Catholic publicist. He died at Neisse, Nov. 26, 1857.

**Eichhorn, Hermann von** (1848-1918). German soldier. Born at Breslau, Feb. 13, 1848, he entered



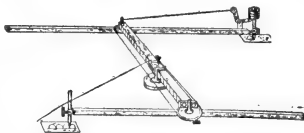
H. von Eichhorn,  
German soldier

the Prussian army as a lieutenant of the Guard in 1866, served in the Franco-German War, 1870-71, and reached the rank of general in 1912. On the outbreak of the Great War he was one of the commanders under Hindenburg on the E. front, and operated in E. Prussia and towards the Niemen. In command of the German 10th army, he took Kovno in Aug., 1915, and Vilna a month later, being made a field-marshal for these successes. In 1918 he led the German forces in the Ukraine, and for some time was military dictator of that country. His arbitrary rule made him unpopular, and he was murdered at Kiev, July 31, 1918.

**Eichhorn, Johann Gottfried** (1752-1827). German scholar. He was born at Dörenzimmern, Oct. 16, 1752, and in 1775 was appointed professor of Oriental languages at Jena, and in 1788 at Göttingen, where he lectured for the rest of his life. He was the first scholar to suggest that the synoptic gospels have one common source, and was a pioneer of the rationalist criticism of the Bible. He died at Göttingen, June 27, 1827.

**Eichhorn, Karl Friedrich** (1781-1854). German jurist. Born at Jena, Nov. 20, 1781, son of Johann Gottfried Eichhorn, he studied at Göttingen and lectured on law at Frankfurt-on-the-Oder, and obtained a professorship at Berlin. He fought against France in 1813, and after 1815 was professor at Göttingen and at Berlin. In his later years he held high positions in the public service. He died at Cologne, July 4, 1854. Eichhorn is perhaps the greatest authority on the laws and institutions of the Germans. Besides his great *Deutsche Staats- und Rechtsgeschichte* (1808-23) he wrote on private and ecclesiastical law.

**Eichstätt.** City of Bavaria, Germany. It stands on the Altmühl, 15 m. N.W. of Ingolstadt. Its industries include the making of boots and beer, but it is chiefly famous for its old buildings and its episcopal associations, for its bishops were princes of the empire until their lands were secularised in 1802. The cathedral, which is dedicated to S. Wilibald and con-

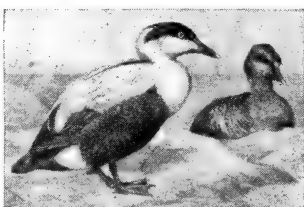


**Eidograph.** Diagram of the instrument. The arms bearing tracer and pencil respectively move parallel in all directions, the connecting beam resting on a fulcrum

tains the tomb of that saint, is largely Gothic, but the towers are Romanesque. Of the other churches the most notable is S. Walpurgis, dating from the 17th century and visited by pilgrims on S. Walpurgis' Day (May 1). There is a palace where the bishops and later the dukes of Leuchtenberg lived; this is now used as a law court, while another palace is used as a library and museum. Above the town is the Wilibaldsburg, once also a residence of the bishops, but now a museum. From 1817 to 1855 Eichstätt was part of the duchy of Leuchtenberg, but it was Bavarian from 1802-17, and again from 1855. Pop. 7,900.

**Eider.** River of Slesvig-Holstein. It rises near Kiel, and flows N.W. and W. across the peninsula to Tönning, where it forms a bay. Its length is about 115 m. Before the opening of the Kiel Canal it was important for navigation. Vessels could go along it as far as Rendsburg, whence a canal took them to Kiel, thus uniting the Baltic and North Seas. This canal developed into the Kiel Canal.

**Eider Duck** (*Somateria*). Genus of wild duck. Including several species, it is famed for the soft down which it uses for lining its nest. Eiders have comparatively short beaks; the males have black and white plumage with green markings on the head, while the females



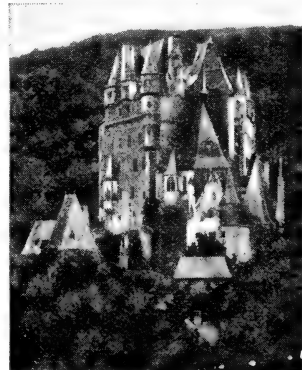
**Eider Duck.** Male, black and white; female, mottled brown

have mottled brown plumage. The common eider (*S. mollissima*) is resident in Great Britain throughout the year, but breeds only on the Farne Islands. The king eider (*S. spectabilis*) and Steller's eider (*Polysticta stelleri*) are rare visitors to Britain.

All the eiders are divers, and feed upon shell-fish and small crustaceans. They keep to the rocky shores and nest on the ground. It needs about six nests to yield a pound of the famous down.

**Eidograph** (Gr. *eidos*, form; *graphein*, to write). Instrument for copying drawings, designs, etc., reduced or enlarged, within limits, to any desired proportion. Something on the lines of a pantograph, it comprises a slotted beam adapted to slide in a socket, having its axis in the centre line of the slot. Underneath each end of the beam is a wheel; the wheels are of the same diameter and geared together by a chain. Sliding in a guide in each wheel is an arm, one of which carries a tracer and the other a pencil, or the equivalent, for copying. The gearing together of the two wheels ensures that the arms will remain parallel for all positions of the instrument. The size of the copy is determined by the position of the beam in the socket.

**Eifel.** Mt. range of the Rhine province, Germany, forming an extension of the E. Ardennes. Of



**Eifel.** Castle of Eltz, in the Eifel range, burnt down Sept., 1920

low altitude (highest peak 2,500 ft.), they trend E. by S. between the Nette and the Ahr rivers towards the Rhine and the Moselle. The E. section is known as the Hohe Eifel, the W. section as Schnee Eifel, while the S. part is called Vorder Eifel. Near Cochem, on the steep wooded banks of the river Eltz, stood the castle of Eltz, a beautiful medieval building of wood and plaster, burnt down in Sept., 1920.

**Eifelian.** Name given to a stage of stratified rocks of Middle Devonian age. It consists of flagstones, shales, and beds of limestone attaining a thickness of 500 ft. in the Dinant district (Belgium), and contains numerous fossil remains of corals and brachiopods. One series of shales (the Calceola shales) is named after a peculiar form of coral. It is well developed in the Eifel district, whence the name, in the Rhine valley, the Hunsrück, the Taunus, and in Bohemia.

**Eiffel, ALEXANDRE GUSTAVE** (1832-1923). French engineer. Born at Dijon, Dec. 15, 1832, he



Gustave Eiffel,  
French engineer

studied at the Ecole Centrale, and executed his first notable work, the bridge over the Garonne at Bordeaux, in 1858. In 1865 he founded ironworks at Levallois-Perret, Seine. His outstanding engineering achievements include the bridge over the Douro at Oporto, 1876; the Garabit viaduct, Cantal, 1882; the great Eiffel Tower, Paris, 1887-89; the movable dome of the Nice Observatory; and the framework for Bartholdi's colossal statue of Liberty in New York harbour. He was one of the first engineers to employ compressed-air caissons in bridge building, and invented movable section bridges. His investigations of air resistance were of service in the development of

aeronautical engineering. He died at Paris, Dec. 28, 1923.

**Eiffel Tower.** Building in Paris. It was designed and erected by Gustave Eiffel, for the Paris Exhibition of 1889. It is 984 ft. high, and is built of iron throughout, 7,300 tons of that metal being used in its construction. The shape is that of a curved pyramid. Electric lifts run to the top. The tower is an important wireless telegraphy station and meteorological centre.



Eiger. Mountain of the Bernese Oberland, adjoining the Mönch, which is seen on the right

**Eiger.** Mountain of Switzerland, in the Bernese Oberland (*q.v.*), adjoining the Mönch; alt. 13,042 ft. It was first ascended by Charles Barrington, 1858.

**Eigg or Ego.** Island of the Hebrides, Inverness-shire, Scotland. Facing the entrance to the Sound of Sleat, it is  $6\frac{1}{2}$  m. long and 4 m. broad. In the S.W. is the Scur of Eigg, a porphyritic peak 1,289 ft. high. The rocks have been described by Hugh Miller in his *Cruise of the Betsy*. Pop. 181.

**Eight.** In rowing, a name applied collectively to the members of a racing crew, when such consists of eight men, in addition to the cox. For the Oxford and Cambridge and other important boat races it became usual to have crews of eight, and so the word came to be used in this sense. *See* Rowing; also *illus.* p. 1211.

**Eight, PIECE OF.** Name given to the old Spanish silver coin, the piastre. It was so called because it was divided into eight silver *reals*, circulated in Spain and Spanish America during the 17th and 18th centuries, and was commonly met with through W. Europe. Its value was about four shillings.

**Eight-Hour Day.** Term used popularly for a working day of this length. Since about 1832 this has

been the ideal of many reformers and numerous workers have secured it, either by legislation or by negotiation. In Australia it is very general, while it has been introduced in the U.S.A. and elsewhere. In 1908 the miners in the United Kingdom secured it, and in 1919 it was granted to the railway-men. *See* Labour.

**Eighty Club.** British political club. It was founded in 1880 to celebrate the victory gained by the Liberals at the general election of that year, its main object being to unite the younger members of the Liberal party and to encourage them in active political work. A president, usually a leader of the Liberal party, is elected annually. Lady members were admitted in 1920. The club's headquarters are at 3, Hare Court, Temple, London; it has no club house.

**Eikon** (Gr., image). Holy image or sacred picture used in the worship of the Greek Church, more usually spelled Ikon or Icon (*q.v.*).

**Eikon Basilike** (Gr., royal likeness). Book purporting to be written by Charles I. and published immediately after his execution, although most of the early editions bear the date 1648. Its sub-title is *The Pourtraicture of His Sacred Majestie in His Solitudes and Sufferings*. It professes to give the king's views of the events of his reign, and a number of his prayers. Milton, in *Eikonoklastes*, replied in detail to the work and first hinted at doubts as to its authorship. Historians take sides respectively for Charles and for John Gauden, later Bishop of Worcester, who claimed to have written it. *See* editions by C. M. Phillimore, 1879; and E. Almack, 1904; consult also *Bibliography of the King's Book*, E. Almack, 1896.

**El.** Sea-loch between Argyllshire and Inverness-shire, Scotland. Forming a W. extension of Loch Linnhe; it is 8 m. long and has a mean breadth of  $\frac{1}{2}$  m. *See illus.* p. 1065.

**Eildon Hills.** Range of hills in Roxburghshire, Scotland. Situated S. of Melrose, they rise into three peaks, the highest of which is 1,385 ft. On the slopes are a supposed Druidical tumulus and remnants of a Roman encampment. According to popular tradition, the single hill was split into three by the "wondrous wizard," Michael Scott of Balwearie.

**Eileithyaspolis** or EILEITHYIA. City of ancient Egypt. It has been identified with the present El Kab, on the E. bank of Nile, 44 m. above Luxor. The goddess of the town, Nekhet, was regarded by the Greeks as identical with Eileithyia,



Eiffel Tower, Paris, seen from the  
Champ de Mars

the goddess of childbirth, hence the Greek version of the Egyptian name (Nekhah) of the city. The ruins are extensive.

**Eilenburg.** Town of Prussian Saxony, Germany. It stands on an island in the Mulde, 15 m. N.E. of Leipzig, and is a rly. junction. It is a centre of the textile industry, and has also a trade in cattle, while other manufactures include chemicals and agricultural machinery. The castle, after which it is named, dates from the 10th century, but the town, known earlier as Millenamstoll, is older. It was part of Meissen and then of Saxony, in which it remained until given to Prussia in 1815. Pop. 17,400.

**Eimeo.** One of the Society Islands, in the Pacific Ocean. It lies to the N.W. of Tahiti, in lat.  $17^{\circ} 32' S.$  and long.  $150^{\circ} 2' W.$ , and is a French possession. It is 9 m. long and 5 m. broad; area, 51 sq. m. The London Missionary Society have a station and a college on the island. In 1903 a tidal wave devastated the island and many people perished.

**Einem, ROTHMAIER KARL VON** (b. 1853). German soldier. Born at Harzburg in the Harz, Jan. 1,



Karl von Einem,  
German soldier

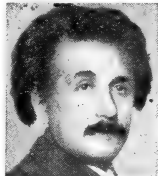
1853, he entered the Prussian army as a lieutenant of cavalry in 1870. He was chief of the staff of the 7th Army Corps in 1898, and in 1903 became a lieutenant-general, and in the latter year Prussian minister of war. In 1907 he was general of cavalry and two years later commanded the 7th army corps. In the second battle of the Marne, July, 1918, he commanded the third German army which unsuccessfully attacked the French, under Gouraud, E. of Reims.

**Einhard** or **EGINHARD** (c. 770-840). Frankish historian. Born in East Franconia, he was educated at the monastery of Fulda and at the court of Charlemagne, where he was a pupil of Alcuin. He was made secretary and superintendent of public buildings by Charlemagne and was responsible for the royal palaces at Ingelheim and Aix-la-Chapelle. He continued to enjoy favour under Louis, Charlemagne's successor, who entrusted him with the education of his son Lothair, and in 815 bestowed on him the domains of Michelstadt and Mühlheim. In 827, unable to compose the quarrels between the emperor Louis and his sons, Einhard retired from court to

Mühlheim, where he founded a monastery. His wife was Emma, the sister of the bishop of Worms, and not a daughter of Charlemagne, as the later legends represent. His chief works are his *Epistolae*, and his *Life of Charlemagne*, one of the best biographies of the Middle Ages, and the source of most of our information about the great emperor. His authorship of the *Annales Regum Francorum* is disputed.

**Einsiedeln.** Town of Switzerland, in the canton of Schwyz. It stands on the Albach, 2,908 ft. above the sea, 25 m. by rly. S.E. of Zürich. One of the most famous pilgrim resorts of the world, it owes its importance to the great Benedictine monastery, containing a miraculous black wooden image of the Virgin. The abbey was founded in 934, but rebuilt in the 18th century; the French sacked the place in 1798, but the treasury and library, with 50,000 vols. and valuable MSS., still contain many precious objects, portraits, etc. Thronged in the Middle Ages, it still attracts many thousands of pilgrims annually. Pop. 9,000.

**Einstein, ALBERT** (b. 1879). German physicist. He was born at Ulm, in Germany, in March, 1879, of Jewish parentage. His school days were passed at Munich, which he left at the age of 16 in order to pursue his studies at the Zürich higher technical school (1896-1900). In 1901 Einstein was naturalised as a Swiss, and accepted a post in the patent office at Berne. While holding this position he published many scientific papers dealing with such subjects as the Brownian movement, the "quantum" theory of energy, and, what



Albert Einstein,  
German physicist

attracted the greatest attention, the theory of relativity. It was in 1905 that Einstein formulated his own theory of relativity in its narrower or "special" form, and this formulation at once raised him to a high place among European scientists. In 1909 he was appointed professor at

the university of Zürich, and in 1911 he left Zürich for Prague, where he was professor of physics in the German section of the university.

In 1912 Einstein was recalled to Zürich as professor of the polytechnic, and in 1914 he went to Berlin as a member of the Academy of Science. In 1915 he caused a veritable sensation in the scientific world by his explanation of gravitational attraction, based on the wider or "general" form of his theory of relativity, and accompanied by an explanation of the anomalous motion of the planet Mercury. He then made a remarkable prediction as to the bending of light rays from the stars which passed close to the sun; the verifying of this prediction by the British solar eclipse expeditions in 1919 made Einstein world-famous. Some scientists place Einstein on Newton's level. See *Relativity*; consult also *The Special and the General Theory: a Popular Account*, A. Einstein, 1920.

**Eisenach.** Town of Germany, in the federal state of Thuringia. It stands at the union of the Nesse and the Hörsel, 32 m. by rly. W. of Erfurt. The chief secular buildings are the town hall, the palace on the market place, until 1918 the residence of the duke of Saxe-Weimar-Eisenach, and a small castle called the Klemda. The chief churches are the Gothic Market Church and the Romanesque S. Nicholas. The house where Luther stayed still stands, and there are the Thuringian museum of antiquities, also Bach and Wagner museums.

The town has a school of forestry and other schools, as well as a theatre. Before the Great War it had an English church. The chief industries are spinning, the building of wagons, and the making of pottery, cigars, beer, etc. Near the Thuringian Forest, the town is visited by tourists. One attraction is the



Eisenach. Entrance to the Wartburg, founded in 1067 and until 1440 the residence of the landgrave of Thuringia

Wartburg (*q.v.*), just outside, and a ruined castle stands on an adjacent rock. The town was founded by a landgrave of Thuringia, and after being part of Thuringia passed to Saxony. It was the capital of one of the little principalities into which Saxony was divided for a number of years, until in 1741 it was finally united with Saxe-Weimar, of which it became the second capital. Pop. 38,362.

**Eisenberg.** Town of Germany, in Saxe-Altenburg. It is 24 m. S.W. of Altenburg, and is on the rly. to Leipzig. The buildings include a castle, churches, schools, etc., and there are several manufactures. Pop. 10,750.

**Eisenstadt.** Town of Hungary, in the prov. of Odenburg, known also as Kismarton. It is 25 m. S.E. of Vienna, at the base of the Leitha Mts. It is famous for its magnificent palace, long the residence of the Esterhazy family. Built in 1683, and enlarged in 1805, this has a fine library and beautiful gardens. The town has also a Franciscan monastery, with a church in which the Esterhazys are buried. Haydn was conductor of the palace orchestra from 1760 to 1790, and he is buried in a church near that of Maria-Einsiedel, a popular pilgrim resort.

**Eisfeld.** Town of Saxe-Meiningen, Germany. It stands on the Werra, 23 m. from Meiningen, and is known for its association with Luther. The town church, a 16th century building, contains a statue of the reformer, and near is the grave of his friend, Justus Jonas, who was its minister. Pop. 4,100.

**Eisleben.** Town of Germany in the Prussian prov. of Saxony. It is 20 m. W.N.W. of Halle, and is famous for its association with Luther, who was born and died there. The chief churches are those of S. Andrew and SS. Peter and Paul. The memorials of Luther include the house in which he died, now a museum, a school which he founded, and a bronze statue. Eisleben has a school of mining, and is the trading centre for the silver and copper mines of the neighbourhood. Eisleben is divided into an old and a new town. It was long on the lands of the counts of Mansfeld. In 1710 it passed to Saxony, and in 1815 became part of Prussia. Pop. 24,629.

**Eisner, KURT** (1867-1919). Name adopted by Salomon Kosnowsky, a German socialist writer and politician. He was born in Berlin, May 14, 1867, of Galician-Jewish origin. Joining the socialists he became associate editor of their organ, *Vorwärts*. When the

Great War broke out he joined his party in supporting it, but before



Kurt Eisner,  
German socialist

and later that of first president of the Bavarian republic. He sought to separate Bavaria from the other German states, and to make separate peace arrangements with the Allies, but unavailingly, and was assassinated in Munich, Feb. 21, 1919. His collected writings, 2 vols., appeared in 1920.

**Eistaler Spitz.** Peak in Czechoslovakia, 8,630 ft. It is one of the most difficult climbs in the High Tatra, but the view from the summit over the wide plain of Galicia to the N., and the Hungarian lowlands to the S., well repays the climber.

**Eisteddfod** (Welsh, session). Welsh national bardic festival. According to tradition, under the name of the Gorsedd or Druidic congress, it was celebrated before the Roman invasion of Britain, and was the repository of the laws, science and poetry of the country. Authentic records go no farther back than the 12th century. The Eisteddfod flourished under the Tudors; on one occasion, in the time of Elizabeth, the assembly being summoned by royal commission. In the Cromwellian period it fell into abeyance, but a notable revival was witnessed in the 19th century. For some time it has been held annually, in the north or south of the principality alternately. Noteworthy features of the occasion are the crowning of the chief bard and the award of prizes for choral, vocal, and lyrical compositions and their rendering, and for excellence in handicrafts, etc. In Aug., 1920, the Eisteddfod was held at Barry, when expression was given to the desire that the festival should concern itself less with ancient bardism and local matters, and be made more representative of national progress.

**Ejectment** (Lat. *ejectare*, to cast out). Name

of an old English action to recover possession of land. Originally it could only be brought by a leaseholder and not by a freeholder; but by the fiction of John Doe judges allowed it to be made use of by freeholders, who preferred it to the cumbersome remedies of a writ of right, or a writ of Novel Disseisin. By the Common Land Procedure Act, 1852, John Doe was abolished, and now an action for the possession of land may be brought by anyone entitled to such possession. See Land Laws.

**Ejector.** Appliance for operating a vacuum brake by exhausting or ejecting air from the brake cylinders. It consists of a pipe within an outer casing with an annular space between the two. When steam is admitted to the pipe, in the act of escaping at the outer end it draws the air from the annular space which is connected by piping to the brake cylinders. Valves are provided for controlling the amount of steam and air admitted. The ejector is fitted in the driver's cab, and is controlled by the engine-driver, but valves are provided in guards' vans so that a guard may apply the brakes independently. The ejector of a gun is a mechanical device which throws out the used cartridges after each round.

An ejector pump is one used principally for the drainage of flat districts and works by means of compressed air supplied from a central station. The pressure of the air forces the drainage through a system of valves, until it reaches its discharging point. These ejectors save the necessity for large central power pumping stations, and for complicated deep-laid drainage systems. As a rule each is suited to control a small district. See Injector; Pump; Steam Engine.

**Ejiboo** or EJIBOO. Town of Nigeria in Yoruba. It is 150 m. N. of Lagos.



Eisteddfod. Ceremony in the Gorsedd circle, in front of the ruins of Aberystwyth Castle, Aug. 1916

**Eka-iodoform.** Name applied to a sterile iodoform produced by mixing with iodoform a small proportion of paraform.

"Eka," the Sanskrit word for one, was used by Mendeleff as a prefix for the hypothetical elements which filled the blanks in his arrangement of the elements according to the periodic system.

**Ekaterina** (Port Catherine). Harbour of Russia, in the govt. of Archangel. It stands on the Murman coast of Kola Bay, 85 m. E. of Lake Enara. The harbour is ice-free all the year round. The naval port of Alexandrovsk close by was founded in 1899.

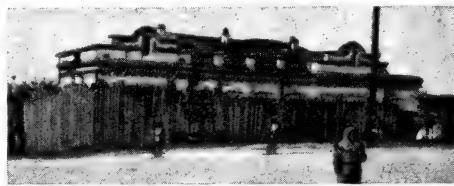
**Ekaterinburg.** Town in Russia, in the govt. of Perm. It stands on the Isset, 175 m. E. of Perm, and is an important station on the Trans-Siberian Rly. It is the centre of the Ural metallurgical works, the assaying laboratory for all the gold of the district. There are iron, marble, porphyry, tallow and soap works, and factories for polishing ornamental stones. Ekaterinburg was founded in 1723 by Peter the Great, and named after his wife. There are two cathedrals, both built in the 18th century. Here, on July 16, 1918, Tsar Nicholas II and his family were murdered by Bolsheviks. Pop. 70,000.

**Ekaterinodar.** Capital of the Kuban republic in the Caucasus. It stands on the river Kuban and a branch of the Rostov-Vladikavkaz rly. It was founded by Catherine II in 1792, and carries on an important cattle trade. It became prominent in the Bolshevik advance against Gen. Denikin's forces in the spring of 1920. Pop. 107,360.

**Ekaterinoslav.** Government of Ukraina. It is bounded on the S. by Taurida, on the N. by Poltava and Kharkov, on the W. by Khereson, on the E. by the Don Cossack territory, and on the S.E. by the Sea of Azov. Three-quarters of the population are Little Russians, the remainder being very mixed. The area is 24,477 sq. m. The soil is the "black earth" and generally fertile. The chief occupations are agriculture, cattle-breeding, bee-keeping, and fishing. The minerals are salt, bog-iron, coal, and sandstone, and the industries include the manufacture of rails, machines, tobacco, and bricks. There are iron-foundries, breweries, tallow boileries, and spirit distilleries. The chief exports are grain, cattle, horses, wool, tallow, leather, and hides. Pop. 3,537,300. *Pron.* Yekaterinosláf

**Ekaterinoslav** (Russ., Catherine's glory). Town of Ukraina, chief town of the govt. of Ekaterinoslav. It stands on the Dnieper

near the beginning of the rapids, 250 m. N.E. of Odessa. There are cast-iron, railway line, and tobacco factories. Ekaterinoslav, which is the chief emporium for the trade with Odessa, was built in 1786 by Potemkin as a summer residence for Catherine II on the site of an old



Ekaterinburg, Russia. Barricaded building in which Tsar Nicholas II and his family were imprisoned and murdered by Bolsheviks

Polish fortress. The town was captured by the Germans in April, 1918. Pop. 220,100.

**Ekhmim, AKHMIM, AKHMYM, OR EKHMYM.** Town of Egypt. It stands on the Nile 70 m. S. of Assiut. For more than 2,000 years it has been the chief centre for the manufacture of the cotton shawls used by the natives. Here are the remains of the temple of Pan (the Egyptian Amsu or Min) and other ruins, and an extensive Egyptian and Roman cemetery. In Early Christian times Ekhmim was an important Christian centre. In the neighbourhood, near the village of Hawawish, have been found valuable papyri, including the "Gospel of Saint Peter." Pop. 23,800.

**Ekron.** Ancient town of the Philistines. It is the modern Akir, a small village situated 23 m. N.W. of Jerusalem.

**Elaeagnaceae** (Gr. *elaia*, olive; *hagnos*, pure). Small natural order of shrubs and trees, natives of the N. temperate and tropical zones. They are more or less covered with silvery or brown scales. They have entire leaves, and small white or yellow flowers. The fruit is membranous, and enclosed in the tube of the calyx. The two best known species are the Oleaster (*Elaeagnus*) and Sea Buckthorn (*Hippophaë*).

**Elaeocarpus** (Gr. *elaia*, olive; *karpos*, fruit). Genus of evergreen shrubs and trees of the natural order Tiliaceae. Natives of the East Indies and Australia, they have alternate, lance-shaped or oblong leaves, and small, white, fragrant flowers in sprays. The cherry-like fruit has a rough-shelled seed.

**Elaeococca** (Gr. *elaia*, olive; *kokkos*, seed). Genus of plants of the natural order Euphorbiaceae. They are natives of China and Japan. The seeds by pressure yield valuable oil, and those from *E. verrucosa*, a Japanese plant, are used for burning in lamps; and a

Chinese species, *E. vernicia*, is obtained an oil useful for mixing paints.

**Elaeolite** (Gr. *elaia*, olive; *lithos*, stone). Dark-coloured variety of the mineral nepheline, chemically a silicate of alumina, soda, and potash. It shows no definite crystal form, has greasy lustre and rough

cleavages, and occurs in many volcanic rocks, e.g. the lavas of Monte Somma and Vesuvius, and in zircon-syenite of Brevig (Norway). See Nepheline.

**Elagabalus** OR HELIOGABALUS. Roman emperor A.D. 218-222. The

son of Sextus Varius Marcellus and Julia Soaemias he was originally called Varius Avitus Bassianus. He was born and brought up at Emesa in Syria, where at the age of 13 he was made priest of Elagabalus, the Syrian sun-god, and assumed his name. By pretending that he was the natural son of Caracalla, his grandmother, Julia Maesa, persuaded the legions in Syria to pro-



Elagabalus, one of the worst of the Roman Emperors

From a bust in the Capitol, Rome

claim him emperor, under the name of Marcus Aurelius Antoninus.

Abandoning the reins of government to his mother and grandmother, he devoted the first year of his reign at Rome to the introduction of the worship of the sun-god, represented by a large conical black stone which he had brought with him from the East. A sexual pervert, his short reign was a continuous orgy of vice. An attempt to murder his cousin Alexander, whom the senate had induced him to adopt as his successor, was frustrated by the praetorian guards, who took Alexander under their protection and afterwards murdered Elagabalus. *Pron.* Ela-gabb-alus.



**Elaine.** (1) Character in *La Morte d'Arthur*. She was the daughter of King Pelles and married Sir Lancelot. Their son was the blameless knight Sir Galahad, who achieved the Holy Grail. (2) Daughter of Sir Bernard of Astolat and known as the Maid of Astolat. Her story appears in Tennyson's *Idylls of the King* (*q.v.*).

**Elam.** Biblical name for a lowland and mountain region in S.W. Persia, N. of the Persian Gulf. Partly known also as Elymais, it comprised the lowlands E. of the Tigris, with the highlands lying N. and E. Wars were frequent between the Assyrians and the Elamites, and Ashurbanipal conquered the latter in 644 B.C. Susa, the Biblical Shushan, in Persia, became the capital of the country, which was watered by the Kerkha (Choespes). Its neolithic population, perhaps anterior to but allied with the Sumerian, developed their agglutinative speech, picture-writing and industrial art under local impulses. At one time dominating Babylonia, it afterwards became subject, allied or independent, and experienced both Semitic and Iranian infiltration. Its vigorous native art excelled especially in metal-casting and jewelry. See Babylonia; Mesopotamia; Susa.

**Elamites.** People of ancient Elam. The ethnic relationships of the Elamites await further research. Although the early human remains are scanty, a shortish, long-headed, black-haired, glabrous stock, allied to the Mediterranean brown race, apparently occupied this region. Semitic intermixture gave them a ruling class, afterwards affected by Aryan elements, resulting in the racial strains discernible in the early Persian domination. The Elamites of Acts ii descended from Jewish settlers in Shushan after the exile, having no ethnic affinity with the native people, whose characters are now submerged under the Beni Lam Arabs of the modern Persian province of Arabistan.

**Elan.** River of S. Wales. It rises on the E. boundary of Cardiganshire, and flows S.E. through the W. portion of Radnorshire to Brecknockshire, where it turns N.E. to form the boundary of these counties and enters the Wye after a course of 15 m. The water-sheds of the Elan and Claerwen, its tributary, have been acquired by Bir-



Elaine, the beautiful daughter of King Pelles, in the Arthurian tales, as depicted by Mouat London

By permission of the artist

mingham, and three reservoirs have been constructed on the Elan, whence the water is carried to the city by an aqueduct 74 m. long.

**Eland.** Genus of large antelopes, found only in Africa. They are the largest of all the antelopes, a fine bull standing nearly 6 ft. high at the withers. In colour, they vary from light fawn to grey, and the bulls usually have a thick tuft of dark hair on the forehead. Both sexes bear horns, about 2 ft. in length, and more or less twisted. They are found in most parts of E. Africa, but appear to be extinct in the South. They frequent wooded districts, and go in herds of fifty or more. Attempts have been made to acclimatise them in Great Britain, where they do well in parks, but they mature so slowly that they cost more in food than they are worth.

**Elandslaagte.** Village in Natal, known for an engagement in the early part of the S. African War. It is on the hills, 16 m. N.E. of Ladysmith, 3,614 ft. above sea



Eland. Specimen of the large gregarious antelopes found in most parts of East Africa

level. On Oct. 21, 1899, General French, with a small force moved out of Ladysmith to attack the Boer positions in the hills. He had with him only a few hundred men, but as the artillery duel was opening he realized that he was outnumbered and telephoned back for reinforcements. British battalions, Gordon Highlanders and Devons, were soon on the scene, also some Lancers and other cavalry, and the attack was pressed, the British advancing in open order up the hills. The Boer artillery was weaker than the British, and with a few casualties their position was taken. Some Boers resisted, but the majority rode away, while about 200 were made prisoners. The British lost 41 killed and 220 wounded; the Boers about 250.

**Elasmobranchs** (Gr. *elasmos*, metal plate; *branchia*, gills). Sub-class of fishes, which includes sharks and rays. They are characterised by the possession of cartilaginous or gristly skeletons, though sometimes the bones are partly calcified. The scales are few and distant, often of a bony character, and somewhat resemble the teeth in structure. The external gill openings are not protected by plates; the mouth is usually placed on the under side; there is no swim-bladder; and the two tail fins are of unequal length. Of their four orders, three are now extinct; only the sharks and rays survive. They are marine in habit, though some occasionally ascend rivers.

**Elastic.** Term more particularly used for a special fabric containing strands of rubber, usually made in the form of tapes, cords, and bands. The word is derived from an assumed Gr. form, *elastikos*, from *elaunein*, to drive, set in motion. See Elasticity; Rubber.

**Elasticity.** Property of matter in virtue of which it resists change in shape or bulk, and tends, after distortion, to recover its original shape or bulk when allowed to do so. Fluids have no fixed shape, and therefore no power to resist change of shape; they have no "elasticity of form"; but they resist compression and have "elasticity of bulk." Solids possess both kinds of elasticity.

An external force producing distortion in a body is known as a "stress" and the distortion itself is called a "strain." The mathematical theory of elasticity deals with the various kinds of strain which a body may suffer, and the stresses corresponding thereto. If the strains are small, the general principle of the relation between stress and strain is "Hooke's Law"—the stress is proportional



to the strain it produces. It is generally assumed that the strain is small, as the elasticity of a solid has a definite limit (the "elastic limit"), and when the strain exceeds this limit it produces a permanent deformation or actual fracture.

A simple example of Hooke's Law is afforded by a steel wire stretched under the tension of a weight suspended from it. Hence the weight is the stress, the longitudinal extension of the wire the strain, and it is found that for comparatively small strains the extension is proportional to the weight. Moreover, if wires of the same material, but of different lengths and thicknesses, are compared, the ratio of stress to strain is still constant, if each is measured on a suitable scale. It is found that for any given material, such as steel, the ratio of stress to strain is constant, and this constant number is called "Young's modulus" for the material. For steel wire it is about 13,000 tons to the square inch, and from this value it is easy to calculate by simple proportion the longitudinal extension of a steel wire of any given length and cross-section, when stretched by a known weight.

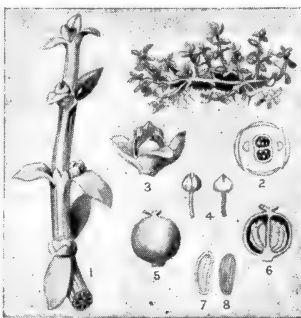
In this case the wire suffers a change in volume as well as in form; the longitudinal expansion is accompanied by a slight lateral contraction, but the volume of the wire is on the whole increased. A strain in which there is pure change of form with no change of volume is known as a "simple shear"; it may be illustrated by twisting a wire. Here, again, for small twists the ratio of the "shearing stress" to the "shearing strain" is constant, this constant being known as the "rigidity." When a solid or a liquid is compressed, the ratio of the compressing force per unit of surface area (stress) to the proportionate diminution in volume (strain) gives another constant, the "volume elasticity," or "bulk modulus."

The theory of elasticity is of great importance to the engineer who has to deal in every kind of structure and machine with material in a state of stress, and consequently to some extent in a state of strain. See Materials, Strength of.

**Elater Beetle** (Gr. *elater*, driver). Group of beetles, also called click beetles. The destructive

wire-worm is the larva of one of these beetles; and the fire-fly of the W. Indies belongs to the same group. See Beetle; Click Beetle.

**Elatinaceae**. Natural order of herbs and small shrubs, distributed generally over the globe. They are



**Elatinaceae**. 1. Flowering branch, magnified. 2. Diagram of a dimerous flower. 3. A flower, more magnified. 4. A magnified stamen, outside and inside view. 5. Pistil, magnified. 6. Pistil, vertical section, showing placentae. 7. Magnified seed. 8. Transverse section of seed

mostly small annuals, growing in marshes, with opposite or whorled leaves. The minute flowers have two to five sepals and a like number of petals, and the fruit is a membranous capsule, containing many seeds. Some of the plants are acrid, being known as waterpeppers.

**Elba** (Gr. *Aithalia*; Lat. *Ilva*). Island of the Mediterranean, belonging to Italy and included in the prov. of Leghorn. It lies 6 m. S.W. of Piombino, the nearest

Marina are among the chief villages. In 453 B.C. Elba was laid waste by the Syracusans. Pop. 30,450.

**Elbasan**. Town of Albania. On the Skumbi, about 65 m. W. of Monastir, it is one of the few important towns of the country, and is the seat of a Greek bishop. It has hot sulphur springs. During the Great War it was the headquarters for a short time of a government formed by Essad Pasha, the Albanian notable who sided with the Allies. After their conquest of Montenegro and N. Albania, the Austrians occupied it in 1916, but it was recovered by the Allies in Oct. 1918. Pop. 13,000.

**Elbe** (anc. *Albis*). River of North-Central Europe. It rises in a number of streams which unite at the foot of the Schneekoppe, a lofty summit of the Giant Mts. (Riesengebirge), which extend along the N.E. boundary of Bohemia. From this mountain, at an alt. of 4,500 ft., it flows S. and W. to Melnik, the head of navigation, 21 m. N. of Prague. It penetrates the Mittelgebirge and the Erzgebirge, waters Saxony, and pursues a N.W. trend to fall into the North Sea, near Cuxhaven, through an estuary of 70 m. between Holstein and Hanover.

At its mouth it is nearly 14 m. in width, its length is 725 m., and its drainage area about 57,000 sq. m. It is navigable by small steamers for more than 500 m., as far as its junction with the Moldau at Melnik. The tide is perceptible as far as Geesthacht, about 110 m. from its mouth. Besides the Moldau, the chief of its many tributaries are



Elba. Fortress and lighthouse of Porto Ferrajo, the capital

point on the mainland, and is 19 m. long by 6 m. broad, with an area of about 90 sq. m. It is wholly mountainous, rising to 3,350 ft. in Monte Capanne, with fertile valleys. The produce of the island includes iron, which has been worked from antiquity, salt, granite, marble, chalk, and wine. Many of its fisherfolk are engaged in the tunny and sardine fisheries.

The capital is Porto Ferrajo (q.v.) on the N. coast, the residence of Napoleon while in exile, May 5, 1814, to Feb. 26, 1815. He had also a villa a few miles S.W. of the town and a country house on Monte Capanne. Porto Longone and Rio

the Havel, Saale, Eger, and Mulde. The Elbe is linked up by a series of canals with the Oder, the Spree, and the Trave, the latter, opened in 1900, connecting Lübeck with Lauenburg. Hamburg, Magdeburg, Meissen, Aussig, Dresden, Torgau, and Wittenberg are important cities on its banks.

There is an enormous traffic along the Elbe, principally by barges, which are assisted by an ingeniously contrived towing chain. Immense quantities of timber are floated downstream from the forests of Bohemia. Plenty of fish are to be obtained, including sturgeon, salmon, pike, and shad.



Elater Beetle. Skipjack beetle of the genus *Elater*

**Elberfeld.** Town of Germany, in the Rhine Province. It stands on the Wupper, 16 m. N.E. of Düsseldorf, and with Barmen, which it adjoins on the E., may be described as the Manchester of Germany. Municipalised in 1610, its industrial prosperity began about 1750. Textiles of all kinds, chemicals, hardware, paper, and beer are made; there are leather, rubber, bleaching and dyeing industries. Railways connect the town with all parts of the Continent, and intercommunication is facilitated by numerous bridges across the Wupper, an overhead electric rly. (*Schwebelbahn*) suspended above the Wupper, and an efficient tramway system. Of the churches the Reformed, Lutheran and adjacent Bergischer Dom of Altenberg are notable; the public buildings include the new Rathaus, law courts, state hall, almshouse, museum, hospital, and head offices of the Bergisch-Märkisch Rly.

There are two large theatres, many educational establishments, botanical gardens, zoological gardens, and hotels; the more modern part contains many fine private residences, and the picturesquely wooded surrounding hills and valleys are dotted with garden-restaurants. Müngsten, which has the highest steel rly. bridge in Germany, built 1893-97 at a cost of £125,000, central arch 560 ft. in span, height 350 ft., total length 1,657 ft.; and Burg, with its schloss, founded about 1140 and restored 1890-94, are favourite holiday resorts. Elberfeld, which is notable for the poor relief system to which it gives its name, passed with the grand duchy of Berg to Prussia in 1815, and has a history dating from the 12th century. Pop. 170,195.

**Elberfeld System.** System of poor relief which originated in the town of Elberfeld, Germany, early in the 19th century, and was reorganized by Daniel von Heydt in 1852. It is carried out by unpaid officials who carefully investigate each case calling for relief. The town is divided into precincts, each with an almoner, who is empowered to administer immediate relief in cases of emergency, and a visitor. Almoners and visitors meet under a district overseer at regular intervals to consider cases and vote relief; and their proceedings are reported to a central body, also unpaid, which includes the mayor, four councillors, and four citizens. Monetary relief is granted according to a schedule; sometimes relief is given in kind, as in the provision of tools, etc., and the system aims especially at avoiding pauperisation by enabling those who receive relief to achieve a position in which



Elberfeld, Germany. General view of the industrial quarter of the town, looking E. from the Kiesberg

they can repay in money or kind the help given to them. The system has spread to other parts of Germany. See Pauperism.

**Elbert.** Granite mt. of Colorado, U.S.A. It is in the Sawatch group of the Rockies, the highest peak of the group, and has an alt. of 14,421 ft.

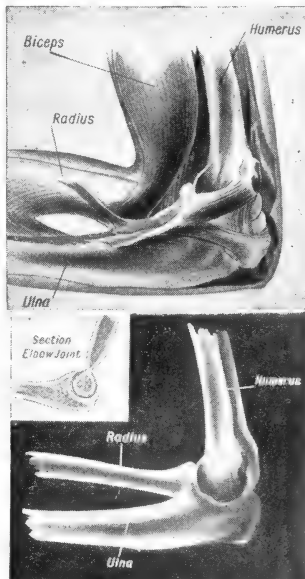
**Elbertian.** Devonian rocks occurring in Colorado. They consist of thin limestone, sandstone, and calcareous shale, and contain fragmentary remains of fossil fish. Their thickness is from 25 ft. to 100 ft.

**Elbeuf.** Town of France. It stands on the left bank of the Seine, in the dept. of Seine-Inférieure, 12 m. S.S.W. of Rouen. Across the river is the suburb of S. Aubin. The chief buildings are the churches of S. Jean and S. Étienne, two Renaissance buildings, and the town hall. There is a museum, and several technical and other schools. The main industry is the making of woollen goods. Elbeuf gives its name to a forest around the town, and at one time there was a duke of Elbeuf. Pop. 18,290.

**Elbing.** Town and seaport of Prussia, in the prov. of West Prussia. It stands on the Elbing, about 5 m. from its mouth in the Frisches Haff. It is 50 m. by rly. E.S.E. of Danzig, and is also connected with the Vistula by a canal. Although an old place, Elbing is in most respects a modern industrial town. S. Mary's Church dates from the 13th century; another, Corpus Christi, is nearly as old. It has an old school, the town hall, library, and most of the other buildings are modern. The chief industries are shipbuilding, iron-working, and the manufacture of machinery, while there are some textile manufactures and a trade in grain. The town has a service of electric tramways, and steamers ply to various ports. Until 1918 much work for the German navy was done here. The town originated round a castle built by the Teutonic Knights; it became a member of the Hanseatic League, and was included in Poland in 1772; at the

partition of that country a little later it became part of Prussia. Pop. 58,500.

**Elbow.** Joint formed by articulation of the lower end of the humerus, or upper arm bone, with the radius and ulna, the two bones of the forearm. The articulation between the ulna and the humerus forms what is termed a hinge-joint, a deep notch in the ulna, the greater sigmoid cavity, gliding backwards and forwards over the trochlear surface of the humerus. The disk-shaped head of the radius contains a depression which articulates with a prominence on the humerus termed the *capitellum*; the edge of the disk articulates with the small sigmoid cavity of the ulna. These articulations permit the rotation of the forearm. The tip of the elbow is formed by a process of bone called the olecranon; the bony prominences, which can



Elbow. Diagram showing the three bones forming the joint; above, relations of the bones and muscles

be felt on the inside and outside of the elbow when the arm is held with the palm of the hand facing forwards (supination), are the internal and external *condyles* of the humerus.

**INJURIES TO THE ELBOW.** These may involve both radius and ulna together, or only one bone. The most frequent dislocation of the two bones together is backwards, and may be associated with fracture of the olecranon, or the coronoid process, a prominence which forms the lower part of the greater sigmoid notch. This condition is accompanied by pain, swelling, and changes in the relative positions of the bony joints to each other, the forearm being kept partially bent and the hand held midway between supination and pronation, *i.e.* between complete external and internal rotation. The dislocation can usually be reduced without much difficulty.

Dislocations of both bones forwards or sideways are much less frequent. When a single bone is dislocated, it is most frequently the radius, since the articulation between it and the humerus is less firm and close than that between the ulna and the humerus. In forward dislocation of the radius the head of the bone rests against the front of the lower end of the humerus, which prevents the patient from completely bending his elbow. Reduction can be effected by pulling the forearm forwards while it is bent at a right angle, and at the same time pressing the head of the bone back into its place.

Sprain of the elbow, or "pulled elbow," is an accident not infrequent in young children, in which the head of the radius slips down, and one of the ligaments becomes nipped between the radius and humerus. It is easily replaced by bending the limb and then extending it. Fractures of the bones forming the elbow-joint frequently complicate dislocation. The humerus may be broken across just above the condyles, or either condyle may be fractured.

**DISEASES OF THE ELBOW.** Tuberculosis of the elbow is more frequent in children than in adults. The joint becomes swollen and painful, and chronic abscesses form which may extend to the surface and break through the skin, thus giving rise to a *sinus*. Treatment consists in keeping the limb at rest and building up the general constitution. Sometimes surgical measures are appropriate. Arthritis of the elbow joint may be the result of septic or gonorrhoeal infection, chronic rheumatism, or gout. Synovitis, which may be acute or

chronic, is inflammation of the synovial membrane which lines the joint. Inflammation and enlargement of the bursa, which lies over the olecranon process, gives rise to the condition known as "miner's elbow." See Anatomy; Arm; also illus. p. 2600.

**Elburz** or **ELBRUZ.** Highest mountain of the Caucasus. It is a little to the N. of the main chain, near the border of the Kuban and Terek provinces. It consists of two extinct volcanic peaks, 18,526 ft. and 18,460 ft. respectively. Elburz was first ascended in 1829. According to tradition, it was the first resting-place of the Ark. See Caucasasia.

**Elburz.** Mountain range skirting the S. shore of the Caspian. It extends for a length of 600 m., and to a width in places of 200 m., through N.W. Persia. On its N. slopes are fertile valleys, and at various points naphtha and petrol are found in considerable quantities. The highest peak is the volcano, Mt. Demavend (*q.v.*).

**Elche.** Town of Spain, in the prov. of Alicante. It stands on the Vinalopó, 13 m. by rly. S.W. of Alicante. Of Moorish appearance, with flat-topped houses, open squares, and narrow streets, the town is nearly surrounded by a plantation of date palms, the fruit being exported as "Barbary" dates. It has an ancient castle of the duke of Arcos, a bishop's palace, and a handsome church (Santa Maria), with a beautiful blue-tiled dome. An important rly. junction, it carries on a trade in fruit, and exports grass mats, wine, hemp, leather, flour, oil, and soap. Santa Pola, its port, lies 2 m. S.E. At the feast of the Assumption, a 14th century musical play is performed. Pop. 30,713. *Pron.* El-chay.

**Elchingen.** Village of Germany, in Bavaria. It stands on the Danube, 8 m. N.E. of Ulm, and is famous for the battle fought here between the French and the Austrians, Oct. 14, 1805. This was part of the campaign that ended in the capitulation of the Austrians at Ulm and their defeat at Austerlitz. The two armies met at the bridge which here crosses the Danube, and which was then in ruins. The French, however, quickly remade it, and the army got across. The Austrians under Mack were already demoralised, and only one part of the army stood to fight, and this was hampered by difficulties of every kind. The chief feature was the surrender of a large number of Austrians. Ney was made duke of Elchingen as a reward for his distinguished services here. See Ulm, Campaign of.

**Elder** (*Sambucus*). Hardy shrub by trees, natives of Britain, of the natural order Caprifoliaceae.



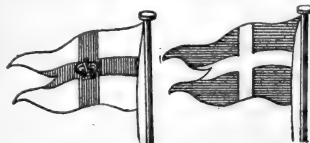
**Elder.** A large specimen of the tree in bloom

Their height is about ten ft.; the flowers are white and variegated. They may be grown in any ordinary soil in open shrubberies. There are a few varieties of *S. European* origin, but they are rarely seen to advantage in British shrubberies. They are propagated by cuttings in autumn or spring. *S. nigra* is the familiar native elder, the berries of which are used for the manufacture of home-made wine. A liquid distilled from the flowers, elder-flower water, is largely used for flavouring confectionery. Owing to its lightness, balls made from the pith are largely used in electrical experiments.

**Elder.** Word used in a civil and an eccles. sense for an overseer. Of frequent occurrence in the Bible, in the O.T. it is applied to the heads or representatives of tribes and families, especially of the Israelites, as the word sheikh is among the Arabs. In the N.T. it is used to define officers of the Church who originally may have been identical with the bishops. Certain office-bearers in the Presbyterian and other churches are called elders. The word alderman (*q.v.*) is a familiar English equivalent of the word. See Bishop; Kirk Session; Presbyter.

**Elder Brethren of the Trinity House.** Members of the corporation of Trinity House, Tower Hill, London, E.C., sometimes known as Trinity Masters. They consist of members of the royal family, prominent statesmen, retired naval officers of high rank, and commanders in the mercantile marine. Ten of these are acting members, who, when required, assist the judges of the admiralty division as nautical assessors in shipping cases. See Trinity House.

**Elder Dempster Co.** British steamship line. It was founded in 1863 by Alexander Elder and John



**Elder Dempster Co. flags.** Left, African Steamship Co. Right, British and African Steam Navigation Co.

Dempster, and greatly developed after 1879 by Sir Alfred Jones. The Beaver Line, one of its undertakings, was sold in 1903 to the Canadian Pacific Railway, but the services to S. Africa, W. Africa, and the W. Indies were retained. The firm was reorganized as a registered company in 1910, the control being acquired by Lord Pirrie and Sir Owen Philipps. At present it manages the British and African Steam Navigation Co., the African Steamship Co., the Elder Line, and the Imperial Direct Line. Liverpool, London, and Rotterdam are the chief ports from which the ships go to Africa. The head offices are at Colonial House, Water Street, Liverpool, and the London office at 4, St. Mary Axe, E.C.

An offshoot, the Elders and Fyffes line, was started in 1902 by Sir Alfred Jones to bring bananas and other fruit from the W. Indies.

**Elder Statesmen.** In Japan an informal body of statesmen who, having retired from the public service, are called upon by the emperor for advice and council on occasions of national emergency or difficulty. The word is sometimes used in a general sense for men of similar character in Great Britain.

**Eldon, JOHN SCOTT, 1ST EARL OF** (1751-1838). British lawyer. Born at Newcastle-on-Tyne, June 4,



*Eldon*  
After Lawrence

1751, his father was a coal merchant in that town. He was educated at the Grammar School, Newcastle, and at University College, Oxford, where he gained a fellowship and was for a time a tutor. He did not, as at first intended, enter the Church, but in 1776 was called to the bar and soon began to practise in London. Success was not immediate, but it came, and in 1782 he became a K.C.

In 1782 Scott entered parlia-

ment as M.P. for Weobley. He forced himself into notice by frequent speeches, and in 1788 Pitt made him solicitor-general. In 1793 he was promoted attorney-general, and in 1799, having in the meantime conducted the prosecution of Horne Tooke, and others holding republican ideas, he was made chief justice of the court of common pleas, and a peer, as Baron Eldon. In 1801 he became lord chancellor, leaving office on Pitt's death in 1806.

In 1807 Eldon returned to the post of chancellor, which he was destined to fill for 20 years, holding the office for a longer period than any other chancellor. During that time he was the most powerful man in Lord Liverpool's reactionary cabinet. He left office in 1827 and died Jan. 13, 1838.

Eldon married Miss Surtees, the daughter of a banker, having run away with her in 1772. His two sons died before him, and his titles—he had been made an earl in 1821—passed to his grandson John (1805-54). The title is still held by his descendants, the earl's eldest son being known as Viscount Encombe. Eldon's elder brother, William Scott, was also a distinguished lawyer; in 1821 he was made Baron Stowell. See Life, H. Twiss, 1844; Lives of the Lord Chancellors, Lord Campbell, 3rd ed., 1848.

**El Dorado** (Span., The Gilded One). Name successively applied to a gilded man, a golden city known as Manoa or Omoa, and a region abounding in gold and precious stones, reputed to exist in S. America. The El Dorado legend apparently originated in a custom said to have been observed by an Indian tribe dwelling on the table-land of Bogotá at the installation of a new chief. His naked body, after being smeared with balsam, was covered with gold-dust, and he plunged into the sacred lake of Guatavita, whilst the assembly cast gold and precious stones into the water.

The Spaniards in America put such faith in the El Dorado legend that the governors of Guiana were styled also governors of El Dorado. They organized many fruitless expeditions in search of this legendary city, Manoa, the earliest being led by a German governor of Guiana, Ambrose Dalfinger, in 1529. In 1595 Sir Walter Raleigh claimed to have located Manoa on an island in Lake Parima, but this lake was proved by the 19th century German traveller, von Humboldt, to be non-existent. The name El Dorado came to be applied to any place reputed to abound in easily acquired wealth.

**Eleanor** (c. 1122-1204). Queen of Henry II of England. The daughter of William, duke of Aquitaine, her first husband was Louis VII of France, to whom she was married in 1137. Her dowry was the great duchy of Aquitaine. In a short time Eleanor and Louis were on bad terms, and in 1152 the marriage was dissolved. In the same year she married Henry of Anjou, who became king of England in 1154. She was the mother by Henry of the turbulent princes who disturbed his reign. Indulgent to them, the queen was concerned in the revolt of 1173. Although of a great age, she moved about in France trying to help John in his fight against Richard. She died April 1, 1204. See Queens of England, A. Strickland, vol. i, 1840.



**Eleanor of Aquitaine, Queen of Henry II**

**Eleanor** (d. 1291). Queen of Henry III of England. The daughter of the count of Provence, she was brought up amid the poets and troubadours there, and was more accomplished than most ladies of her time. In 1236 she was married to Henry at Canterbury. Throughout her residence in England she was most unpopular. The charges against her resolve themselves into a love of foreign relatives and avarice. In 1276 she entered a religious house at Amesbury, Wiltshire, where she died, June 25, 1291. Her two sons were Edward I and Edmund, earl of Lancaster. See Queens of England, Agnes Strickland, vol. i, 1840.

**Eleanor** (d. 1290). Queen of Edward I of England. The daughter of Ferdinand III, king of Castile, she was married to Edward in Oct., 1254. She fled to France in 1264 when her husband was worsted by the barons, and was in Palestine with him in 1270. She died at Harby in Nottinghamshire, Nov. 28, 1290, and was buried at Westminster. The king erected crosses at the places at which her body rested on the journey—Lincoln, Grantham, Stamford, Geddington, Northampton, Stony Stratford, Woburn, Dunstable, S. Albans, Waltham, Westcheap, and Charing. See Queens of England, Agnes Strickland, vol. i, 1840.



**Eleanor of Provence, Queen of Henry III**

**Eleatic School.** One of the chief pre-Socratic Greek philosophical schools. It was founded by Xenophanes of Colophon at Elea in Lucania in lower Italy; its other chief representatives were Parmenides and Zeno (both of Elea), and Melissus of Samos. The kernel of their doctrine was the unity and unalterableness of Being (that which really had a right to the name of existence), the unreality of Becoming (material changes), of Plurality, and of sensual perceptions. The real nature of things cannot be perceived by means of the senses, but is only attainable by thought. All that is given us by the senses is mere appearance. Since the senses show us only plurality and the manifold, and since the separate parts of the world, such as it presents itself to our senses, both differ in themselves and are subject to constant change and movement, they asserted that Being was only one, unchangeable, and immovable. Only Being is; non-Being is not; there is no Becoming. Starting from the assumption that the idea of real Being excludes anything contradictory, the Eleatics argued that Plurality, and above all Movement, could neither be Being itself nor found in connexion with Being.

**Election** (Lat. *electio*, choice). Term used in several senses, legal, theological, and political. In English law a man has sometimes to choose which of two courses he will take. Thus, if A. B. sells me first quality oats and delivers second quality, I can either reject them altogether or keep them and pay for them, counter-claiming for breach of warranty of quality. But I cannot keep the oats and decline to pay. If I do not forthwith reject them I have *electio* to keep them. Again, circumstances sometimes arise where one has to choose, or elect, whether one will retain the benefit of a gift *inter vivos* (among the living), as, for instance, under a marriage settlement or a deed of appointment; or give it up and take a proffered benefit under a will. Election implies knowledge; that is, a man can only elect where he knows his rights.

**Election.** Term used in theology for the doctrine that God from eternity has chosen certain persons for eternal life. In the O.T. the term elect is applied to the Israelites, as the chosen people of God. In the N.T. the members of the Christian Church are called the elect in 1 Peter 2, and in S. Paul's epistles to Thessalonians, Colossians, and Timothy. The Calvinistic view that God has elected certain persons to be saved and

others lost, and this solely by His own Will and irrespective of any merit or demerit in the individuals, was never held previous to the Reformation. The usual view was to identify the elect with the baptized, in the sense that they had been chosen and called to a Christian profession; but to recognize the possibility of falling away from such a profession. Only those who persevered in Christian living to the end could be regarded as the people whom God had foreknown and chosen from the beginning as His faithful followers. The Church catholic has never maintained that the election of the faithful implied the condemnation of those denied the opportunity of election.

**Election.** In politics, and to some extent in business, the choosing of representatives. The methods of election vary, but, generally speaking, a bare majority of votes is sufficient to secure election, although this may be either a majority of the votes cast, or a majority of those entitled to vote.

The first elections were decided by the casting of lots, a method in force among the Greeks and Romans, but modern ideas are averse to this. Election by the votes of the electors began with the growth of the idea of representation. In the 12th century, and perhaps earlier, the reeve and four men represented the village communities of England on various occasions, and in some rough manner these four men were elected by those for whom they spoke. The system grew with the growth of parliamentary institutions; knights of the shire, and burgesses for the boroughs, were elected, as well as other officials. Until quite modern times the method was rough; those present just held up their hands, or shouted, much as they do at a public meeting to-day, and the sheriff declared certain men elected.

There is proof that the sheriffs abused their power, declaring the election of persons not rightly chosen, and checks upon them were introduced. For parliamentary elections there came in the method of open voting on the hustings, and then the present system, which is almost entirely the creation of the 19th century. It includes voting by ballot, a careful enumeration of the votes cast, and, if necessary, a scrutiny and recount; indeed, every possible device to secure that the wishes of the voters prevail.

Elections are divided into general and bye. A general election is when at a stated time all the members retire, as on the dissolution of parliament; and a bye-election is when an election is necessary

through a death or resignation. In elections for many local bodies, e.g. town councils in England, it is customary for one-third of the members to retire every year, so there is never a general election. County councils, however, have a general election every third year.

A fundamental division is between direct and indirect elections. In the former the voters themselves choose their representatives, each voter having as many votes as there are members to be elected. Elections to the House of Commons are the best known of this kind. Indirect elections are when the electors choose certain men who, in their turn, elect the actual representative. The most notable existing instance of this kind is the election of the American president, who is actually elected by a college of electors. The Venetian republic had an elaborate system of indirect election when choosing a doge. The election of aldermen in English boroughs and county councils is a somewhat different kind of indirect election. They are chosen by the directly elected councillors, but the latter are not returned solely, or even mainly, for this purpose. In some countries members of the Senate or second chamber are chosen by indirect election.

Elections at the best are but a crude test of the people's will, so vast are the numbers engaged, and so great the possibilities of manipulation. It has actually happened more than once that a minority of electors have returned a majority of the members to the British House of Commons. To make this impossible, and also to secure the representation of minorities, various proposals, proportional representation and the alternative vote, for instance, have been put forward.

At elections of company directors a show of hands is usually sufficient, but, under certain conditions, those dissatisfied with the decision can demand a poll. In elections of this kind, unlike political ones, the shareholders have votes in proportion to their interest in the company. A further device prevails at elections of members to clubs and societies. There a small number of members can keep out a candidate by voting against him; this is called blackballing, from the practice of using black balls for this purpose. Election is the term used for the choice of fellows or scholars at the colleges of Oxford and Cambridge. Professors are also elected in most cases; those appointed to choose them being called electors. See *Alternative Vote*; *Company Law*; *Politics*; *Proportional Representation*; *Vote*.



**Electoral Commission.** Name given to the body of men created by an act of Congress in the U.S.A., Jan. 29, 1877, to settle certain disputed questions in connexion with the electoral votes of four states in the presidential election of 1876. It was the only disputed election in American history. It was decided to create a commission to determine which of two or more conflicting certificates received from any state of the votes cast by the electoral college of such state for president and vice-president in the 1876 election was the certificate provided for in the constitution. The judgement in each case was that the certificate of the votes cast for Rutherford B. Hayes and William A. Wheeler, the republican candidates for president and vice-president respectively, was the certificate containing the lawful electoral vote of the said state. The other certificates were declared void. The electoral votes were then counted, and Hayes and Wheeler were declared duly elected.

**Electorate** (Lat. *eligere*, to select). Name given to the whole body of electors or voters in a constituency or country. See Election.

**Electors.** In general, persons who have the right of voting at elections. In a special sense, however, the name was applied to the German princes who in the Holy Roman Empire voted at the election of the king.

Like many other early peoples, the Germans elected their kings; but, unlike them, they retained this practice—at least, in theory—until modern times. These elections may be said to have begun with the choice of Conrad I as king in 911, but it was often merely a form, the eldest son of the late king being confirmed as ruler, as was Otto the Great. The electors were powerful when there was no obvious successor to the throne, two or more candidates claiming it, as in 1198, and more so after the death of Frederick II in 1250. At first all the princes took part, or were entitled to take part, in the elections, but soon many of them ceased to attend. In 1257 the number taking part was seven. This number became fixed, was recognized by the pope, and at Aix-la-Chapelle statues of the seven were erected.

Trouble then arose as to who were the favoured seven. Certain princes, e.g. the archbishop of Mainz and the elector palatine of the Rhine, were acknowledged to be electors, but in other cases there were difficulties, especially when two men divided a duchy between them. The matter was settled in

the Golden Bull issued by Charles IV in 1356, which fixed the number at seven, who were named. Three were archbishops—Mainz, Cologne, and Treves—and the other four were the elector palatine, the duke of Saxony, the margrave of Brandenburg, and the king of Bohemia. Each held an office at the emperor's court. The clerics were archchancellors for his three kingdoms, Germany, Italy, and Burgundy; the elector palatine was his steward, Saxony his marshal, Brandenburg his chamberlain, and Bohemia his cupbearer. The archbishop of Mainz was president of the electoral college, and on the death of a king summoned the electors to Frankfurt.

The power of the seven electors was greatly increased by the Golden Bull. They were made almost sovereign rulers, with privileges not enjoyed by the other princes of Germany. They formed a college, one of the three sections of the imperial diet. The composition of the college remained unchanged until 1623, when the elector palatine lost his vote, which was given to the duke of Bavaria. In 1648 he was restored as an eighth elector. A ninth electorate was created in 1708 for the ruler of Hanover, and this was held by George I and other English kings. To keep up old theory these new electors also held offices, the elector palatine being treasurer and Hanover standard-bearer. In 1778 the ruling family of Bavaria became extinct, and the elector palatine secured their lands, thus uniting two votes. In 1806, with the dissolution of the empire, the electors ceased to exist. See Empire; Germany; Golden Bull.

**Electra.** In Greek mythology, daughter of Agamemnon and Clytemnestra. She incited her brother Orestes, when he grew up to manhood, to murder his mother, Clytemnestra, in revenge for the latter's murder of his father on his return from Troy. The tragic life of Electra forms the subject of tragedies by Sophocles and by Euripides. See Agamemnon; Clytemnestra; Orestes.

**Electric** (Gr. *elektron*, amber). Term referring to anything with which electricity is associated. In addition to the articles in this Encyclopedia which appear under compounds and variants of the word, e.g. Electricity; Electrostatics; Electro-metallurgy, etc., there are numerous other articles on electrical matters, but for greater convenience these are placed under the main word. The advantage of this system is that it enables the electrical aspect of a

given subject to be placed with the non-electrical branch of the same subject. Thus Electric Clock is a section of the article Clock and Electric Bells of the article Bells. The chief of these articles are:

Arc	Fuse	Radiator
Battery	Generator	Railways
Bells	Heater	Resistance
Cable	Lamp	Sign
Clock	Lift	Symbol
Coil	Lighting	Telegraphy
Condenser	Locomotive	Testing
Conductor	Machines	Traction
Current	Meter	Unit
Fire Alarm	Motor	Welding
Furnace	Potential	Wiring

**Electrical Engineers,** INSTITUTION OF. British organization founded as The Society of Telegraph Engineers in 1871. Its name was afterwards changed to The Society of Telegraph Engineers and Electricians, and finally, in 1889, to its present designation. It was incorporated under the Board of Trade in 1883. The institution has local centres in Great Britain and at Calcutta, Cape Town, and Hong Kong. Its London address is 1, Albemarle Street, W.

**Electric Charge.** Term used for certain states of electrification of a body. When two substances are pressed hard or rubbed together and then drawn apart they are found to have developed properties which they did not apparently possess before, the most striking being the power of attracting each other and light particles of other substances. They have developed or acquired an electric charge and are said to be electrified.

All bodies seem able to develop or acquire such a charge more or less, but if different substances so charged be examined the remarkable fact emerges that, while the charges have certain properties in common and act in accordance with the same laws, there are two different kinds, one kind being developed by certain classes of substances and the other by other classes, with this qualification, that either kind may be developed on some substances according to the material with which they are rubbed. The two kinds of charge are represented by that developed on a glass rod when rubbed with silk, and by that produced on a stick of resin when rubbed with fur or wool; the former has received the name of positive electricity and the latter that of negative electricity. Another remarkable characteristic of these charges is that one is never developed by itself but both are always produced at the same time, one kind being found on one of the bodies rubbed and the other kind on the other body.

No adequate explanation has yet been found for these phenomena.



Neither the development nor the dissipation of an electric charge makes any measurable difference to the weight of the body. The phenomena are doubtless bound up with the elemental constitution of matter, and as our knowledge of that constitution increases the explanation of the electric charge and its double character will duly appear. See Electron.

**Electric Discharge.** Act of neutralisation of an electrical charge. Electricity which resides chiefly on the surface of bodies may disappear in any one of several ways. It may be carried away continuously through a wire or metal rod, and is then said to disappear by conductive discharge; it may disappear suddenly as in a spark or a flash of lightning, which is said to be a disruptive discharge; or it may go gradually by being communicated to particles of air in its neighbourhood, which then fly off by repulsion, when it is said to disappear by convective discharge. Convective discharge may take place in a liquid as well as in air.

The electricity which disappears in any of these ways reappears in some other form of energy. Thus the energy which goes out in a conductive discharge may present itself in the light of an electric lamp or in some chemical action; that of a disruptive discharge presents itself in the form of sound or light or heat, or all three, or in some mechanical effects, as when a sheet of glass is shattered or pierced by the discharge; that of a convective discharge may be found in the movements of the particles of air which may be set flying in all directions with increased temperature.

The discharge in a resisting medium, as in air, is always accompanied by the development of heat; an electric spark will light a gas jet; the discharge in certain forms of electric furnaces will melt the most refractory metals. The discharge is now applied in industry in the manufacture of nitrates and nitric acid from the air, and in detonating high explosives as in shells and mining cartridges. Very beautiful luminous effects are produced by the discharge through vacuum tubes, that is in rarefied air or gas; while the physical effects produced in the gas or air are very remarkable, the molecules of the gas being broken up and the atoms interchanged, thus producing what is called ionisation. The Röntgen or X-rays (*q.v.*) are indirectly produced by such electric discharges.

**Electric Fish.** Genus of fishes possessing the power of administering an electric shock. There are three known fishes which possess

such a power, these being, in the order of their electrical strength, the electric eel (*q.v.*), the African catfish, and the torpedo, a species of ray fish.

The electrical catfish (*Malapterurus electricus*) is found in all the larger rivers of Africa, the finest and most powerful occurring in the Nile. It frequents the darker and more sluggish portions of the streams, where it kills or stuns other fish which it eats. It is found up to four feet in length. In some catfish the electrical power seems present all over the body, in others just under the skin at each side.

The torpedo or electrical ray is the most numerous of these fish. A considerable number of species occur in the warmer seas of the world, and at least two are found near the southern shores of the United States. The best known is the *Torpedo marmorata* of the southern shores of Europe and of the Mediterranean; large specimens may weigh as much as 80 lb. The electric force resides in the powerful tail.

The muscles and the nerves which are concerned in the exercise of the electrical power of these fish

are known; the direction in which the current of electricity flows through the body of the fish in each case is also known, this direction being from tail to head in the electric eel, from head to tail in the catfish, and from underneath up in the rays; but the source of the power and how the organisms become charged with it is not known. Its exercise evidently calls for much nervous force, as after a particularly powerful shock or a series of shocks has been given the fish is exhausted, and must have rest.

**Electrician.** In the general sense, one who is skilled in the science of electricity, or who is engaged in the art of applying electricity to practical ends, that is to say, a worker in electricity. Hence it covers in the broadest view the university professor, the student, the man who "wires" a house or tests a faulty telephone line, and the telegraph, the "wireless," and, equally, the telephone operator. One who designs or constructs electrical works or industrial electrical machinery, or who operates such, is called an electrical engineer. See Engineering.

## ELECTRICITY: GENERAL INTRODUCTION

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*This article forms an introduction to the group of articles on electrical subjects which follows it, and also to others scattered throughout the work. It is followed by articles dealing with special forms of electricity, e.g. Atmospheric, Medicinal, etc.*

The scientific study of electricity began in the 16th century. The ancient Greeks were acquainted with some isolated facts concerning the electrification of a few substances by friction, the epithet "electric" being, in fact, coined from the Greek word *elektron*, the name for amber, which was one of these substances. This term, among others, was introduced by William Gilbert, of Colchester, who made the first detailed study of the property of attracting light materials, which bodies acquire after being rubbed with textiles such as silk or flannel.

Gilbert, who might be called the father of electricity, published in 1600 his great work *On the Magnet, Magnetic Bodies and the Great Magnet the Earth*, paving the way for the systematic and scientific experiments on electrical phenomena which culminated with those of Faraday. Until Gilbert published his results nothing was known about electricity, save that certain substances as amber, jet, etc., attracted light objects such as leaves, feathers, etc.

The researches of Boyle, Newton, and Gray in England, of Von Guericke in Germany, and Du Fay

in France, had, by the first half of the 18th century, established the fact that all materials could acquire this property, i.e. be electrified, by friction. In the case of some substances such as very dry glass, sulphur, wax, ebonite, and mica, the property is confined to the portion of the surface which has been rubbed; but in general it tends to be diffused over the surface, no matter where friction has been applied. This power of "conduction" is manifested most notably in the case of the metals, but is also possessed by most of the materials which constitute the earth's crust, also by animal tissue and any damp surface. It is for this reason that such materials cannot retain the electrification unless suspended or supported by insulating strings or rods of silk, sulphur, glass, etc., and thus the earliest experimenters, notably Gilbert, were misled into the belief that these were "non-electric."

Du Fay (and also Kinnersley and Franklin in America) discovered the dual quality of electrification, and ultimately Franklin's terminology was adopted, which referred to bodies as "positively" or "negatively" electrified, according



Electricity. A demonstration of electrical experiments made before Queen Elizabeth by William Gilbert of Colchester (1540-1603), an English pioneer in electrical discovery

*After the painting by A. Acland Hunt*

as they exerted a force of repulsion on a glass rod which had been rubbed with silk or on a stick of resin which had been rubbed with flannel. Quite early in the eighteenth century electric machines capable of producing fairly intense effects, such as spark and physiological shock, were designed. They took the form of balls, cylinders, or disks of sulphur or glass rotated by hand and rubbed by the dry palm of the operator or by a pad of silk, flannel, or rubber, coated with a metal amalgam.

#### Electricity's Dual Nature

It was Du Fay who apparently was the first to make the postulate that electrification is the result of an inequality in the amounts of two "electric fluids" or "electricities" which a body possesses, an excess of positive fluid producing positive electrification (similarly for negative), equality of amount resulting in neutrality or absence of "charge." Franklin, in America, maintained a one-fluid theory, neutrality corresponding to the possession of a normal amount of the fluid on the part of the body, while positive and negative effects are the result of excess over or defect under this amount. As a matter of fact, while the main results of the science can be expressed readily in terms of either theory, recent research on the structure of the atom rather emphasises the dual nature of electricity.

Much more important than

either of these speculations was the discovery of induction and the development of condensers. Modern text-books make a point of presenting the concept of potential to the student's mind at an early stage. There is no doubt in any teacher's mind of the difficulty experienced in acquiring correct ideas concerning this concept, probably due to the fact that, as human beings, we possess no sense corresponding to that by which we appreciate temperature (the analogous concept in the science of Heat); and so great use is made of analogies in such presentation. For example, the notion of pressure is appealed to, and the flow of electricity from one conductor to another at a different "potential" is likened to the flow of gas along a tube from one flask to another at different pressures.

#### The Leyden Jar

All these analogies, however, break down in one important particular. The mere juxtaposition of a flask of gas at great pressure does not affect the pressure of gas in a neighbouring receptacle. But the presence of an electrified body has a very marked influence on the potentials of all neighbouring insulated conductors. The first discovery of this fact is due to Von Guericke in the 17th century; but its application to the manufacture of condensers, i.e. conductors which can retain a relatively enormous charge at a moderate potential, did not begin until the middle

of the eighteenth, when the so-called Leyden jar was accidentally discovered by Musschenbroek and Cunaeus while endeavouring, by means of a chain depending from a machine, to electrify water contained in a bottle which rested on the observer's hand.

#### Development of Electrokinetics

This discovery was the starting point for the development of the condensers, which play such an important part in the induction coils, telegraphic, telephonic, and wireless apparatus of to-day, and also of the influence or induction machines of the Voss type, which have completely displaced the old frictional machines. The middle of the 18th century also witnessed Franklin's famous investigations on atmospheric electricity, his identification of lightning with the electric spark, and the subsequent discovery that even in fine weather there is a progressive difference of potential between the air and the earth's surface with increase of altitude. In the 18th century were laid the foundations of the mathematical theory, due to the discovery of the inverse square law of force between electrified bodies by Coulomb, in France, and independently by Cavendish in England.

At the very beginning of the 19th century came the extremely important researches of Volta at Pavia, leading to the development of electrokinetics. His prime discovery was that two plates of

different metals when immersed in a solution of a salt or acid remain at slightly different potentials even when connected with a conducting wire, and so on any theory of the material nature of electricity, there must be a flow of electricity along the wire. Further, that by connecting any number of such "voltaic cells" in series there is theoretically no limit to the difference of potential which can be established between the terminal plates of the battery (excepting, of course, a breakdown in the insulating power of the air). During the early years of the century various batteries of a more constant strength were devised by Daniell, Grove, Smee, and others, and employed in the study of electro-chemical decomposition of solutions, the earliest attempts in this direction being made by Carlisle, Nicholson, and Davy in England, and Ritter in Germany. These researches were continued later by Faraday with signal success, and in 1835 modern physical and electro-chemistry may be said to have come into being with the enunciation of Faraday's well-known laws of electrolysis.

#### Science of Electro-Magnetism

In another direction Volta's work was to lead to still greater results. In 1819 Oersted of Copenhagen discovered the existence of a "circuital" magnetic field round a wire joining the terminal plates of a battery. The science of electro-magnetism originated in that experiment. Within a few years Ampère had extended Oersted's experimental work and had published a mathematical theory of it, afterwards amplified by Weber. Galvanometers of various types were invented by Nobili, Pouillet, Thomson, and D'Arsonval. But no investigations rank higher than those of G. S. Ohm, who between 1825 and 1830 published the results of his work on the connexion between current strength in a conducting wire and electromotive force.

It is a rather deplorable fact that the very thorough and complete experimental work which Ohm carried out in support of his famous law is absent from nearly all current text-books. In fact, even in his own day, many physicists were entirely ignorant of his experiments and believed that he had only given a theoretic deduction of the law. The introduction of the concept of "resistance" into electrical science produced considerable reactions both in theory and experiment, and by 1843 Wheatstone, then holding the chair of physics at King's College, London, had perfected his well-known method for determining resistance.

Michael Faraday's work on electrolysis has already been mentioned. But his work on electro-magnetism was destined to play a more revolutionary part in science. By 1831 he had discovered the existence of electromagnetic induction, i.e. the creation of electric currents in a conductor by the variation of a surrounding magnetic field. Later, continuing some investigations of Jenkin, he discovered the phenomenon of self-induction. It should be stated that similar results were obtained independently and almost simultaneously by Joseph Henry at Albany, New York. Modern dynamo-electric machinery originated in these famous experiments.

#### Faraday and Clark Maxwell

In another direction Faraday revolutionised electric theory. He destroyed the old "action at a distance" view of electric force by his discovery of the effect of the surrounding medium on the force between two charged bodies—the "specific inductive capacity" of the medium, as it is called. This discovery led Faraday to postulate transmission of electric force through the "polarised" particles of the medium, a view which was eagerly accepted by J. Clark Maxwell and developed by him with great mathematical power in his famous work on the subject. In Maxwell's hands the theory predicted the transmission of electric waves through space, a result beautifully confirmed in 1888 by Hertz, which has had such marvellous fruition in wireless telegraphy and telephony.

Space only permits us to mention that the work of the twentieth century has had its own distinctive impress. Beginning with the experiments of J. J. Thomson on electric discharge in vacuum tubes and of Curie, Rutherford, and Soddy on radioactive materials, it is unlocking the secret of the atom and finding confirmation of Du Fay's old notion of the two "fluids," in the "electron" and the "positive nucleus," the planet and sun of the "solar system" which is accepted by all physicists nowadays as a working model of atomic structure.

#### James Rice

**ELECTRICITY IN MEDICINE.** It is not surprising, having regard to some of its remarkable manifestations, that the idea should have presented itself to many minds that electricity is a "vital" force. It has been long recognized that it is a force that kills; and the conception that it should be able to cure, more or less, the physical ailments of man is not unnatural. Unfortunately a good deal of charlatanism has been associated with the

idea of the curative powers of electricity, not only in Great Britain, but perhaps still more on the continent of Europe and in America. The so-called electric or magnetic "belts" in connexion with which the public is frequently informed that "electricity is life," may be dismissed quite briefly. As a matter of fact magnetism alone has no physiological action whatever. Any curative effects which such appliances may appear to produce are



Electricity in medicine. Patient with hand and foot in electrical bath undergoing treatment for heart disease

due to the warmth which they communicate to the body of a patient by their substance only, and to the faith which they inspire in his mind, and not at all to any electrical power which they possess.

For the first demonstration of the physiological effects of electricity we have to go back to 1678, when Swammerdam showed to the Grand Duke of Tuscany that a piece of the muscle of a frog's leg hanging by a thread of nerve bound with silver wire would instantly contract if both nerve and wire were simultaneously touched by a piece of copper. Galvani and Volta, not knowing of Swammerdam's demonstration, made their classical experiments on dead frogs and their legs more than a century later, and first excited general scientific interest in the physiological effects of electricity. Since then many experiments have been made on newly killed animals, always with the result that muscular movements were produced.

In practice electricity is used in the three forms, static, galvanic, or continuous, and alternating, or what is sometimes termed faradic. For the production of the first the Wimshurst influence machine may be used. This form is employed to



Electricity. A powerful electro-magnet used by an oculist to extract a steel splinter from a workman's eye

regulate and modify functional processes such as nutrition, secretion, circulation, and sleep; and in some inflammatory conditions, paralysis, skin affections, consumption, and cancer. For the production of the "faradic" form an induction coil is used, the current from the secondary coil being applied to the body by means of electrodes, as when the galvanic form is employed. Faradic electricity is used in spinal and some other forms of paralysis, in gout, rheumatism, muscular rheumatism, and cramp, eczema, constipation due to indigestion, hypochondria, neurasthenia, and hysteria. When applied to the abdomen or spine a flat, oval electrode is used; when it is desired to pick out a particular muscle a small needle-shaped electrode is employed; while the current is also applied directly in the stomach by means of a small bean-shaped electrode at the end of a wire covered with india-rubber, which is introduced into the stomach and withdrawn when the necessary dose has been given.

#### Use of Electrodes

Drugs are introduced into the system through the skin by the aid of special electrodes carrying at their extremities a little roll of blotting or absorbent paper which is saturated with the drug to be introduced; the paper is attached to the cathode or negative end of the circuit and is applied to the skin where it is desired to introduce the drug, the other end of the circuit being applied to some other portion of the skin. In this way the drug is gradually introduced into the tissues just where it is required, and may have more active effect than if taken through the mouth or ad-

ministered in the ordinary hypodermic fashion. In general debility and in convalescence after illness electricity may greatly aid recovery by improving nutrition, and by its general tonic effect. Used in health under proper control its tendency is to increase muscular power.

Electricity is used also in medicine to illuminate the interior of certain parts of the body by the direct introduction of minute electric lamps and particularly for the examination of the throat and the eye; and as a cauteriser for the destruction of superfluous hairs, warts, and other abnormal growths; while powerful electro-magnets are employed to pull particles of iron out of the eye. The X-rays, while not strictly electrical, are indirectly so, being a secondary product of electric action, and constitute probably the most valuable of all the contributions made by electricity to medical science.

**ATMOSPHERIC ELECTRICITY.** The atmosphere, for a certain distance above the earth, has been proved to be almost continuously charged with electricity. Normally the electricity of the air is positive and that of the surface of the earth negative, and if we take the average of fine weather as determined by a series of careful examinations carried out at Kew many years ago, as represented by  $+4$  as the potential, it would appear that in this country the potential rarely falls to 1, though now and again it may drop for a moment to as low as  $0.1$ . It is strong during E. and N.E. winds; in wet weather with sudden heavy showers it may be as much as 30 either positive or negative; during snow the strength is about the same as in wet weather, but it is nearly always positive. With high wind and snow or severe frost it may go to  $+100$  or even higher. In thunder-storms it will often be over 100 either positive or negative, though at such times it may reach  $-200$ , there being usually a preponderance of negative electricity in thunder-storms. It may change instantly from positive to negative or negative to positive with a flash of lightning, and with only less rapidity with a sudden shower of rain. Even in fair weather the changes may be rapid, while in storms the oscillations may be so frequent and violent as to keep the indicating instruments in continual agitation. In all regions there appear to be at least one period of high intensity and one of low every twenty-four hours, and in some two such maxima and minima periods. Apart from the normal electric condition of the atmosphere and the

obvious manifestation afforded by thunder-storms, the Aurora offers another evidence of profound electrical disturbance in the earth's atmosphere. It cannot, however, be said that our knowledge of the cause or causes of atmospheric electricity is as yet either exact or complete.

#### Theories of Atmospheric Electricity

Many plausible theories have been put forward to account for the phenomena: evaporation of water from the surface of the earth, the friction of the particles of air in the wind, or of particles of water in the air, the heat currents in the atmosphere, the volumes of steam emitted by volcanoes and geysers, have all been suggested as causes and rejected as inadequate explanations. The fact that the ultraviolet rays of the solar spectrum will discharge a negatively electrified body as if they were themselves positive, has suggested that radiation from the sun may give a positive charge of electricity to the atmosphere which in turn would induce negative at the surface of the earth.

A theory propounded by Sir J. J. Thomson appears to offer a satisfactory explanation of some of the immediate phenomena of atmospheric electricity. This assumes that when the vapour of water in the atmosphere first condenses it does so by preference on particles of dust that are negatively electrified, and that in consequence the first formed parts of fog or cloud are heavier than those formed later, and, falling first to the ground, carry with them the negative electricity. The theory, however, does not go very far. It is possible that all the suggested causes to which reference has been made contribute more or less to the electricity of the earth's atmosphere, but there is little doubt that we must look to radiation from the sun as the chief source.

#### Electron Theory

Arrhenius, the Swedish scientist, has suggested that the sun is continuously bombarding space with electrons (*q.v.*), that the great mass of those approaching the earth are gathered up by the magnetic forces which are concentrated about the earth's poles, where, owing to the rarefied atmosphere in those regions, they become manifest in aurora, precisely as in a vacuum tube when a discharge of electricity takes place therein. Accepting this highly probable theory, it is easy to suppose that not all the electrons are carried to the poles, that some penetrate other portions of the earth's atmosphere. And, in any

case, air currents may well suffice to distribute electricity from the polar regions through the rest of the atmosphere. **A. J. Liversedge**  
**Electric Lighting Acts.** Acts of Parliament regulating the supply of electric lighting. When it became evident that electricity might become a rival of gas as a source of private and public light, it became desirable to put its generation and supply for such purposes under more or less legislative control, on similar lines to that governing gas and water. The first Act was passed in 1882, and was extremely severe in its conditions,

one clause providing that a local authority could take over an undertaking supplying its people after 21 years upon paying the owners of the undertaking the net value of the works, land, etc., at the time. This clause undoubtedly delayed the development of electrical services in Great Britain to a serious extent. Another Act passed in 1888 modified the former, while a third passed in 1909 still further encouraged enterprise, and has led to considerable development in works for the supply of electricity "in bulk." See Lighting, Electric.

supplied by all these undertakings in that year amounted to 2,840,000,000, of which about 600,000,000 were used on tramways. The lowest average price at which the electricity was supplied by these undertakings, according to public returns, was .85d. per unit, at which rate Stockport supplied 23,000,000 units in the year ended Dec. 31, 1919. The supply of electric power by these undertakings is under the control of the Board of Trade, and the highest rate permitted to be charged is 8d. per unit; average prices of from 6d. to 7d. per unit were, in 1919, charged in a considerable number of instances.

## ELECTRIC POWER AND ITS USES

**A. J. Liversedge, Associate Member, Institute of Civil Engineers**  
*The extent to which Electric Power is used may be deduced from this article; also the various uses to which it is put. See Dynamo; Energy; Fuel; Railways; and the various articles on electrical subjects*

The dynamo may be classed with the printing press, the steam-engine, and the paper-making machine, as among the great epoch-making inventions of mankind. It has already revolutionised industry, and it would not be easy to set a limit to the ultimate developments in the economic and social life of the world to which it may give rise. The steam-engine concentrated industry in regions where coal abounds; electricity is diffusing it over regions where, but for its remarkable power, manufactures would be impossible.

At one time the power-mechanical energy required for industry had to be generated where it was needed. To-day, however, it may be generated at one centre and utilised over an area of thousands of square miles. Formerly anyone who wanted power on any considerable scale had to generate it himself, and a large portion of his capital would be sunk in the power-generating plant. To-day power has become a common commodity to be bought and sold, in all essentials precisely like any other commodity. And this development has been brought about, like many other industrial and social changes, by improved means of transport which electricity has provided. The profound significance of this revolution is perhaps not yet fully appreciated. It may mean the displacement of many of the great industrial centres of the world.

Electricity does not create power; it is itself a product of mechanical or chemical energy, and not an original source. The dynamo takes in power from some other agent, and gives it out again in the form of mechanical energy, chemical action, heat or light; the conversion always means some

loss of energy. The advantage of electricity lies in the extraordinary facility with which it may be transmitted over long distances and then reconverted into any form of industrial energy required. It is this property which has led to the utilisation all over the world of elevated bodies of water as sources of mechanical energy. Water from these elevated sources is led in pipes down to some convenient point, at anything from 100 to 3,000 ft. below, and there drives hydraulic motors which, in turn, drive electricity-generating machines. Such hydro-electric power stations are now in operation in Great Britain (on a very small scale), in Scandinavia, France, Switzerland, Spain, Italy, Germany (small), Czecho-Slovakia, India, Tasmania, New Zealand, S. Africa, most of the countries of S. America, and on an immense scale in the United States and Canada. The greatest power stations are those, American and Canadian, which utilise the Falls of Niagara; the total power now available at those stations being about 500,000 kilowatt (666,000 h.p.).

### British Electric Power Stations

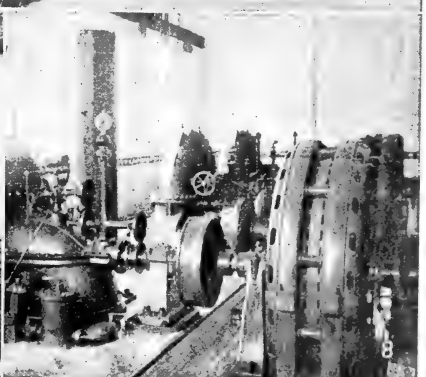
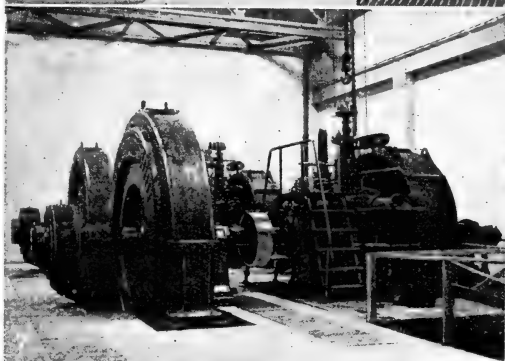
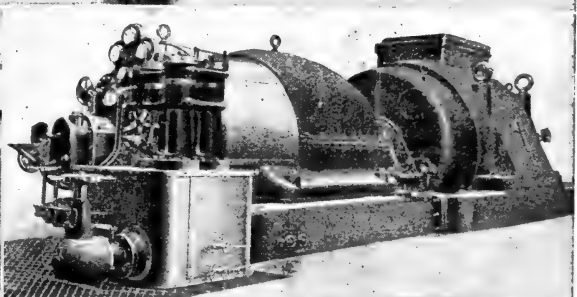
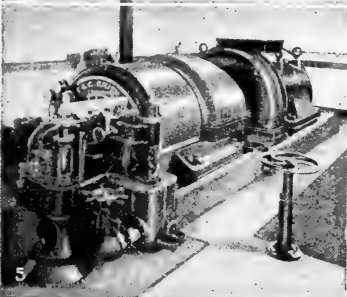
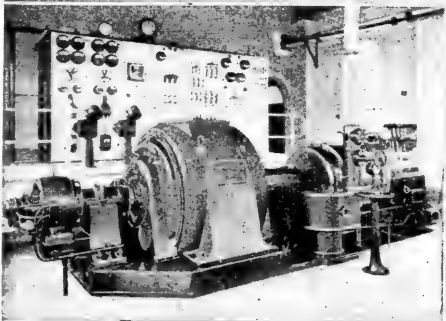
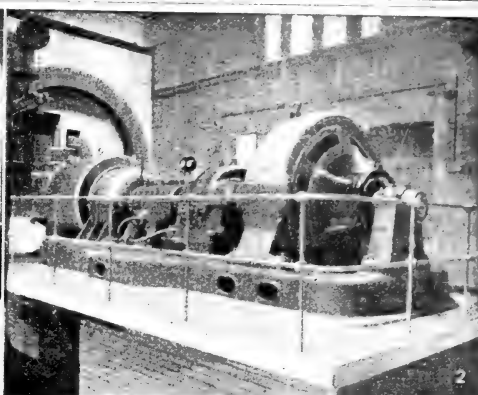
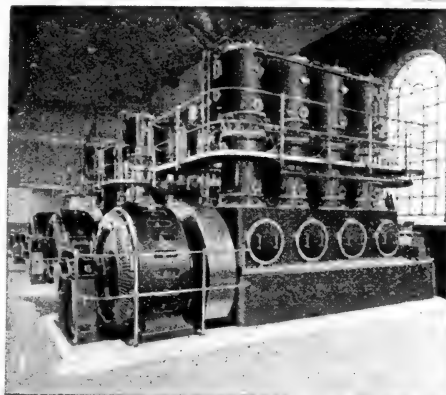
Coal, however, is probably still the chief immediate source of electric power, and in Britain with one or two trifling exceptions, the sole source. In the United Kingdom there are now 276 electric power stations, of which 190 are municipal undertakings, the remainder being companies. The largest of these is that of Manchester, which in 1919 delivered 184,675,000 units at an average price of 1.15d. per unit. Sheffield supplied 161,839,000 units at an average of .99d. per unit; Glasgow, 144,930,000 units at 1.41d.; and Birmingham, 140,908,000 at 1.6d. per unit. The total units

### Problem of Economic Transmission

Just before 1920, two Government committees investigated the whole question of the provision and supply of electric power in Great Britain, one having been specially concerned with the possibilities in connexion with water-power as the immediate source of the energy, the other with the possibilities in connexion with coal, upon which it is recognized that the country must still chiefly depend. The direction in which improvement is to be sought lies in concentrating the development of the electric energy in large stations situated in the great coal-producing centres, and transmitting the energy so developed to the power consuming districts. In this way it is believed great economies could be effected in the cost of developing electric power as compared with the present costs in the many power stations scattered over the country. Such a concentration would permit the use of large individual generating units with a considerable economy in the first cost of plant. Until recently the largest units used in Great Britain were the 6,000 kilowatt turbo-generators (8,000 h.p.) at the Lots Road Power Station, London, which supply current to most of the London electric underground railways. Units of 10,000 kilowatt and 7,500 kilowatt are, however, now running. A Parsons turbo-generator of 25,000 kilowatt capacity was recently installed in the central power station of Chicago, U.S.A.

Electric power is now being rapidly extended to rlys., for which service it has many advantages over steam, more particularly for suburban lines with their numerous stations; to the smelting and refining of metals, and to many chemical manufacturing processes. Among these latter may be mentioned particularly the production of aluminium which is





1. Three 375-k.w. alternators driven by blast furnace gas engines. 2. 400-k.w. generator driven by steam turbines. 3. 400-k.w. turbo-generator, showing switch-board. 4. Two 7,500-k.w. turbo-generators for municipal supply. 5. 2,000-k.w. turbo-generator in use at

mines. 6. High-pressure turbo-generator, 6,300 k.w., for light and power supply. 7. Turbines and generators, 2,500 h.p., at the Holloway Road Generating Station, London. 8. Scandinavian electricity supply station, driven by water-power turbines

**ELECTRIC POWER AND LIGHT MACHINES**



now obtained solely by the aid of hydro-electric power; and the manufacture of artificial fertilisers by the fixation of the nitrogen of the atmosphere, which is now being carried out on a considerable scale in Scandinavia, the product as prepared for agricultural use being known as nitrolime.

The useful properties of electricity together with the increasing cost of coal are now compelling attention to the possibility of using other and new sources from which to obtain the energy. Natural oil offers no appreciable advantages over coal in this connexion, though low classes of oil are now being used in Diesel engines (*q.v.*) for the development of electricity. It has been predicted that we shall one day cultivate oil-yielding plants specially for the purpose of providing fuel to be used in such classes of engines for the development of electric power. It is possible that the tides, especially where they run to considerable heights, may one day be utilised; and in tropical and subtropical regions, the direct rays of the sun. Edison has studied the possibility of constructing a voltaic cell in which the latent energy of coal, much the larger part of which is now wasted in the most economical systems of power development, would be directly converted into electric power. Sir Oliver Lodge looks ultimately to the liberation of atomic energy; while Sir Charles Parsons, reviving an old project, would obtain energy from the internal heat of the earth.

#### Utilisation of Natural Steam

Meanwhile the most remarkable electric power development system in the world is to be found in Italy, where the internal fires are actually being utilised. The *soffioni* of Tuscany are well known and have long been a principal source of borax. They are openings in the crust of the earth through which, from time immemorial, volumes of steam have poured day and night. Prince Gironi-Conti, on whose estate *soffioni* occur, has now tapped some of this natural steam before it comes to the surface by driving pipes into the ground, and is using it as the heating agent in special steam boilers for the development of electric power by turbo-generators.

**TRANSMISSION AND DISTRIBUTION.** Since the earliest days of the present industrial era, even before the inventions of James Watt gave so great a stimulus to industrial development, the transmission of power, mechanical energy particularly, has always been a branch of applied engineering of the highest importance. Until the modern de-

velopments in electricity, transmission was effected chiefly by shafting and gearing, belts and ropes, and in some cases by wire cables running over pulleys. All these systems, even the latter, were extremely limited in their scope. Here and there the attempt has been made to transmit power over considerable distances by means of steam, water, or air carried in pipes underground. None of these agents, however, can compare with electricity in regard to the facility with which convertible energy can be transmitted over long distances.

#### Telegraphic Power Transmission

Electric transmission may be considered under three heads, factory, local, and long distance. The principles involved are the same in all; the differences lie chiefly in the scale on which those principles are applied. The medium mostly employed to-day for transmission, and for distribution, is copper wire, though aluminium is now being used to some extent, and may ultimately displace copper; weight for weight it is a much better conductor, and therefore at equal cost and equal durability would be the more economical medium. For telegraphic power transmission, galvanised iron wire is mostly used, being permissible because of the relatively small amounts of current which need to be transmitted. In all cases of electric transmission a medium for the return of the current to the source of generation is required—the circuit must be complete. This medium may be provided by a separate wire, by the rails of a tramway or railway, or by a system of separate rails or T bars, or by the earth, which is a universal conductor and equaliser.

Transmission and distribution, in the case of factories where the electricity is generated on the premises, present no difficulties. The current is usually continuous or direct and the voltage comparatively low, 200 to 250 volts, and rarely over 500. In large establishments with many buildings and much machinery a separate system for lighting, and heating, may be installed; otherwise the lighting distribution will be taken off the same mains which supply the electric motors for driving the machinery. The mains or conductors will be encased so as to avoid risk of personal contact or short circuiting, exposure to moisture, accidental injury, as by the driving in of a nail, or any conditions likely to cause personal injury or fire.

A question that may call for careful consideration will be as to

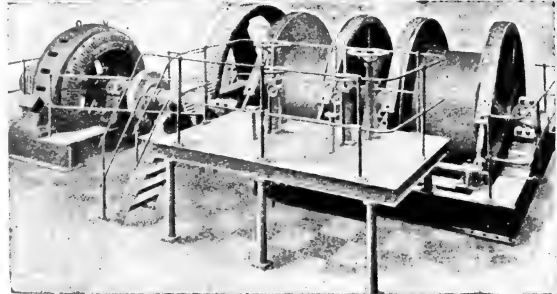
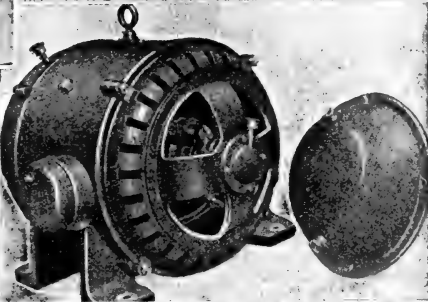
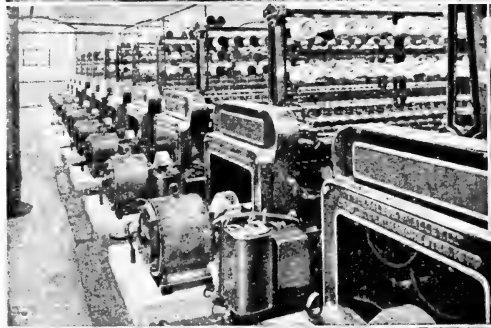
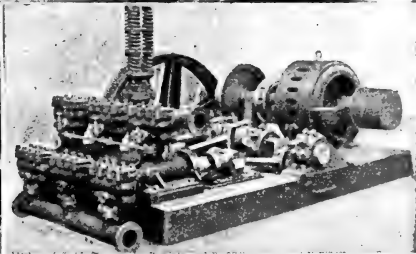
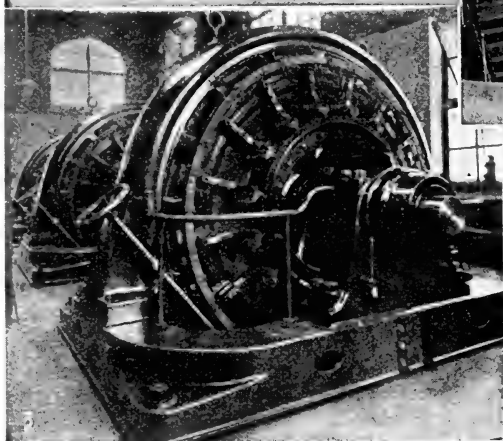
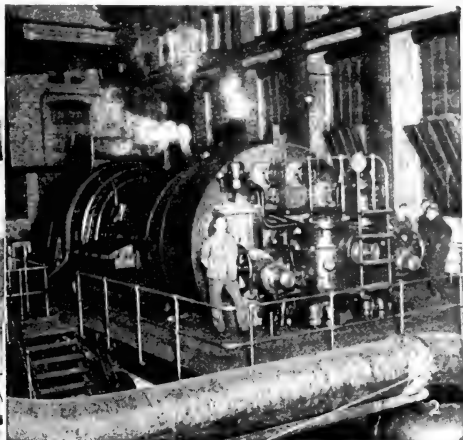
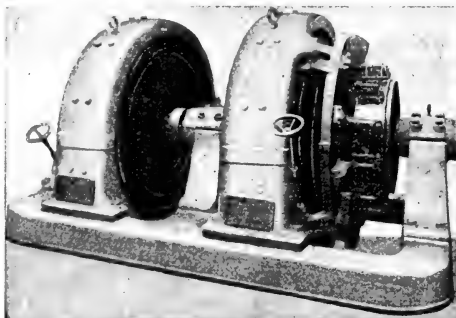
whether the machines shall be arranged to be operated in *series* or in *parallel*, that is to say whether the current shall pass through one machine to the next, or each take its own supply independently from the main. Arc lamps are largely operated in series; and some economy in cost of installation may be secured by adopting that system, but as the system involves the addition to each machine or lamp of a shunt device which will automatically cut out a lamp or machine from the circuit if it goes wrong, and pass the current round it on to the next, and as, further, it is practically inapplicable to incandescent or glow lamps, the balance of advantage lies with the system of working in parallel, under which the failure of one lamp or machine does not necessitate any disturbance of the remainder.

Local transmission and distribution represents a much larger, more complex, and difficult problem. The work is in the hands either of a municipal authority or of a public company; in either case it may assume a four-fold aspect—the provision of light and heat to domestic and business users, public lighting, the provision of power to workshops, and lastly power for electric traction. The supply of private light and heat will usually be the first consideration, and two antagonistic factors will present themselves. The ordinary domestic incandescent or glow lamp cannot take current at more than 200 volts; large numbers still in use must be supplied with current at a much lower pressure.

#### Cost of Installation

On the other hand, the conductors for transmission and the distributing lines, whether of copper or of aluminium, are costly, and the only way by which the cost of installation can be kept within reasonable limits is to generate the current, and put it into the main at as high a pressure as may be permissible. As in the case of steam the higher the pressure the larger the amount that may be passed through a given size of pipe; so with electricity the higher the pressure—voltage—the smaller may be the size of the mains for the transmission of a given quantity. Thus the conditions at one end require a low voltage; at the other end a high voltage; and a compromise will have to be adopted having regard to all the conditions of the district to be served.

Voltages as low as 100 are in use in the stations of Great Britain, but the newer installations will usually be arranged for voltages between 250 and 550. Hence the current put



1. 750-k.w. motor generator raising 230-volt current to 460 volts. 2. Manchester Corporation's 35,000-h.p. turbo-alternator. 3. Underground standard type sub-station transformer. 4. 180-h.p. motor operating powerful rain pumps. 5. Series of 3-phase motors,

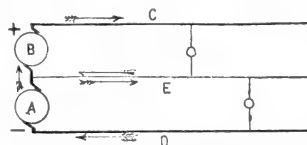
1,500 r.p.m., driving cotton mill machinery. 6. Totally enclosed motor, showing one end cover removed. 7. 600-h.p. motor driving hauling gear at a colliery. 8. Motor driving belt transmission gear for a French process knitting yarn drawing machine

# ELECTRIC POWER: TYPES OF ELECTRIC MOTORS

into the conductors for transmission may have to be "stepped down" at convenient points, and here the character of the current, as well as the strength, will have to be determined, that is whether continuous or direct, or alternating. Direct or continuous current, which has the advantage of simplicity, cannot be stepped down directly without the use of rotating machinery. In large systems this may be accomplished by the aid of sub-stations to which high-tension current is transmitted from the central station, to be there let down by mechanical transformers to suit the local needs. Alternating current, on the other hand, may be stepped down by the use of static transformers, which are automatic and require nothing more than a street box for their installation.

#### The Hopkinson System

An ingenious method of meeting the requirements where direct current is employed was devised by Dr. John Hopkinson, and is known as the three-wire system of distribution. This is illustrated in the appended diagram. A and B are two dynamos coupled in series, that is, the current from A passes through B. C D are two mains or conductors constituting a primary



Electric Power. System of transmission devised by Dr. John Hopkinson. See text

circuit. If the voltage of each dynamo is 100, the current put into the main C will be at 200 volts: that is, the potential difference between C and D. But the current from A dynamo is going into the third wire E at 100 volts, and the potential difference between E and D will therefore only be 100, which will also be the difference between E and C; and consequently any lamps between E and D or E and C will be receiving current only at that voltage. A further subdivision by means of additional wires is sometimes arranged.

Except for tramlines, where the current is mostly carried by the familiar overhead lines, local transmission and distribution is carried almost universally in Great Britain by conductors placed underground. The conductors may be simply wire or cables thoroughly insulated and protected against damp or mechanical injury, and laid in the ground under the foot-path. In more elaborate schemes,

groups of conduits composed of earthenware pipes are prepared.

The pipes are carefully cemented together to exclude water, and a number are left empty for future use. At suitable points the conduits are interrupted and provision is made by which access can be got down to them. The cables are pulled through these conduits from point to point, and in order that they may stand the severe usage to which they are subjected in being drawn through the conduits, they are encased in lead.

Apart from the main transmission conductors, there will usually be laid supplementary conductors known as feeders. These convey current to some more or less distant point of a main conductor, and compensate for whatever may have been taken from the main up to that point by distributors. In large systems where extended areas are to be served, and a great variety of demands have to be satisfied, the transmission and distributing network may become very complex. To meet such cases, alternating current at high tension, ranging from 1,000 to 6,000 volts, is being employed at several stations in this country. At one London station the current, alternating, is generated and transmitted to sub-stations at 10,000 volts; at the sub-stations it is stepped down by motor generators (see Motor, Electric) to 400 volts continuous current, which is supplied to users for power at that tension, and, by means of the three-wire system, to users of light at 200 volts.

#### Long Distance Transmission

For long distance transmission alternating current is almost invariably employed, because of the facility with which it can be lowered by the aid of stationary transformers; while the current is usually three-phase on account of the economy of copper required for transmission. The most remarkable transmission system in the world to-day is in the state of California, U.S.A., where current generated by water power at Big Creek is transmitted to Los Angeles, a distance of 240 m. From the great stations of Niagara, current is transmitted locally at 2,250 volts, but is sent into Buffalo 16 miles away at 11,000 volts. A remarkable system is in operation in the south of France, where continuous current is used at 58,000 volts. See Current, Electric; Dynamo; Volt.

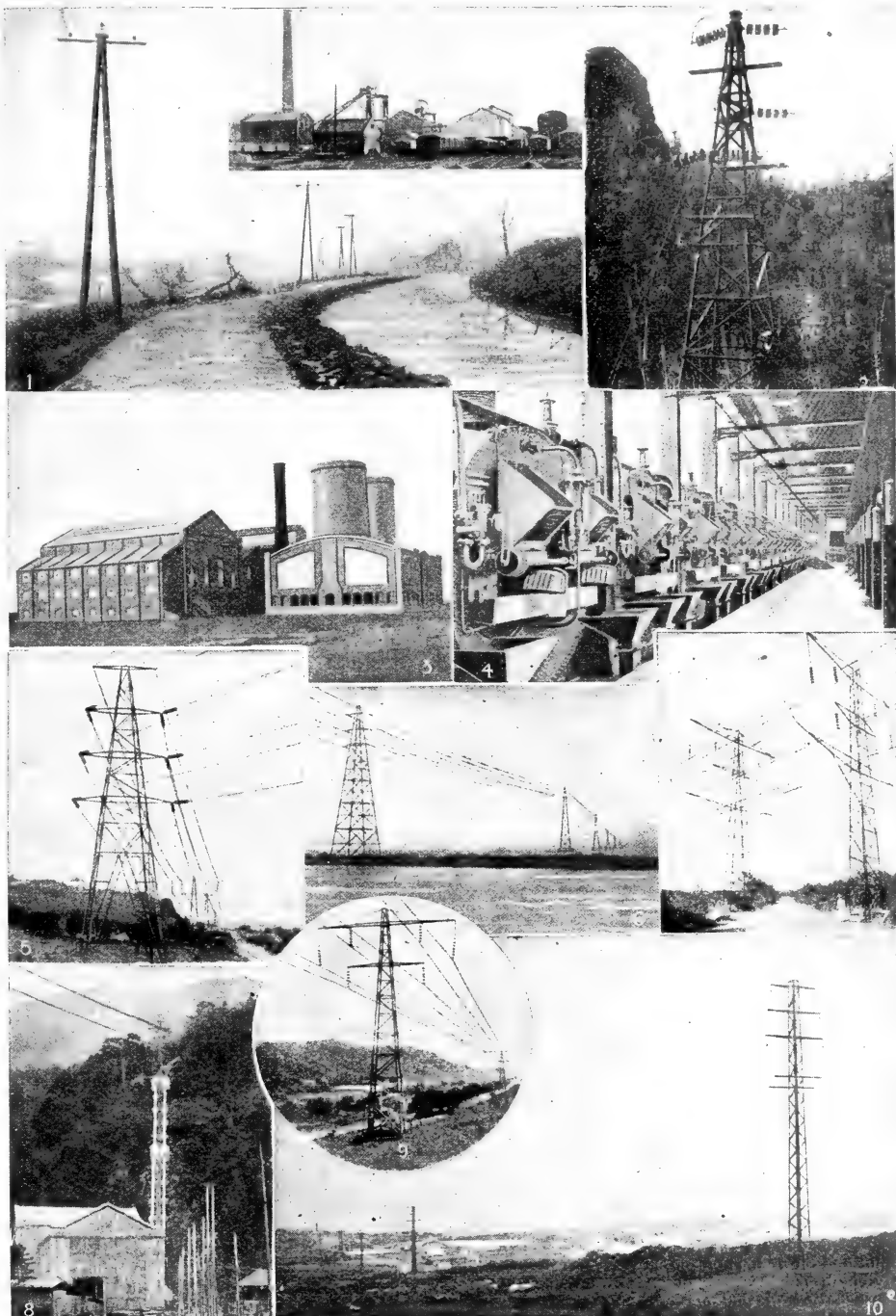
**Electric Wave.** In an insulated conductor carrying a charge of electricity, the charge will be distributed in a regular manner over

its surface, and if another conductor be brought near it the distribution of the charge will be altered, say negative at the one end, positive at the other. If now the second conductor be suddenly removed the original charge will return to its former distribution, but not at once. Before the original condition is reached the charge will oscillate along the conductor, positive and negative each rushing from one end to the other and then back again.

These oscillations are extremely rapid and quickly die away. This movement suggests that of a wave, but it is not strictly of that character. But if two conductors be discharged by a spark there will again be oscillations set up between the terminals of the conductors, with this difference—the charge thus liberated sets up disturbances in the surrounding medium which are in the nature of true waves and go on travelling through space. These waves have been found to possess all the optical properties of the waves of light, and can be reflected, refracted, and polarised. These facts were demonstrated in 1888 by Heinrich R. Hertz, who succeeded in producing electro-magnetic waves by means of "oscillators" in such a way as to permit him to trace their propagation through space, which he found went on at the same velocity as that of light. See Light; Wireless.

**Electro-Ballistics.** Determination of the velocity of projectiles fired from guns by electrical methods, the success of which depends upon the fact that the time taken for an electric current to travel along a wire over any such distances as those covered by the range of even the most powerful guns, is inappreciable.

The appliances used consist of frames of light wire mesh electrically connected with a chronograph. One such frame is placed near the muzzle of the gun that is to be tested, as close up as may be so long as it is far enough away to be unaffected by the blast of the discharge. The frame is placed in the line of flight of the projectile; the resistance offered by the wire mesh to the projectile is negligible. A similar frame is placed at a measured distance from the gun also in the line of flight; or a series may be placed at measured intervals. When the gun is fired the projectile crashes through the wire mesh, the electrical arrangements come instantly into action and the exact moment is indicated by the chronograph. It is only necessary to compare the times recorded by



1. Overhead transmission in English Potteries district. Inset, British colliery; coal is still the chief source of British electrical power. 2. Carrying electricity at 50,000 volts through the forests of N. Zealand. 3. Steam electric power house in South America. 4. Boiler house of a British power station. 5. Transmission lines at 80,000

volts, belonging to the Victoria Falls Co. 6. Carrying electric power across a span of 1,175 ft. at 100,000 volts, over the Thana, India. 7. Transmission lines and masts in India. 8. Japanese hydro-electric power station. 9. Transmission lines at Victoria Falls, see Fig. 5. 10. Electric transmission at 10,000 volts in Cornwall.

# **ELECTRIC POWER AND TRANSMISSION IN VARIOUS PARTS OF THE WORLD**

the two or more instruments in order to determine the time of flight and the velocity. By analogous arrangements fitted in the barrel of the gun itself the velocity of the projectile from the instant when it begins to move in the barrel till it leaves the muzzle are determined. *See Artillery; Gunnery.*

**Electro-Chemistry.** The determination of chemical reactions, that is to say, the splitting up of bodies into their elements or into other compounds and the formation of new bodies, by the aid of electricity. Like most other branches of science, it has two sides, the purely scientific or theoretical, and the applied. That an intimate relation existed between the two branches of physics, chemistry and electricity, was suspected by the early electricians; its existence was demonstrated when the two Dutch scientists, Deimann and Paets van't Troostwyk, at Haarlem in 1789, first decomposed water into its elements by the aid of electric sparks between the ends of two wires in a glass tube, though

may after all only be a particular form of electricity. It has been shown that when copper deposits itself out of a solution of copper sulphate on a piece of iron wire introduced into the solution, the action is really electrical; and the question is suggested whether what has hitherto been called "chemical affinity" is not a form of electrical action. By either of these two forms of energy we are able to develop heat and light; and each is able to accomplish ends which, to our present knowledge, the other is not able to achieve; and it is certain that if we ever obtain any definite conception of the constitution of matter and the real nature of the atom, it will be reached by the aid of electro-chemistry.

On the practical or industrial side electro-chemistry has given us the art of electro-plating and of electro-deposition generally, embracing the electrical refining and smelting of metals; many metals, such as sodium, potassium, aluminium, magnesium, which could

not otherwise be produced on an industrial scale; the electrolytic production of caustic soda and potash, chlorine and bleaching powder; of cyanamide and other ammonia compounds, nitric acid, and artificial fertilisers such as "nitrolime." Nor

and causing the process to be completed in a much shorter time. For purifying sewage, ageing wines, and preparing ozone, electricity is coming more and more into daily commercial use.

**Electro-Culture.** Study of effects of electricity on plants. Currents of certain low strengths appear to be beneficial to plants; strong currents soon cause their collapse; while currents of intermediate strengths apparently set up no particular reaction. The idea of utilising an electric current, either through the ground or in the atmosphere, to stimulate the growth of plants or increase their yield, was preceded by the idea of stimulating the growth by electrifying the seeds themselves before planting. The Abbé Nollet, the French philosopher, about 1760, Berthollet, and Specnew experimented in this direction, apparently demonstrating that electrified seeds generally germinated earlier and gave higher yields, and that a larger proportion of the seeds germinated.

There are three directions in which electricity has been applied to growing plants; by the setting up of electric currents in the soil, by electrically exciting the atmosphere, and by providing artificial light. The question as to which is the better of the two first systems is not yet determined. Careful experiments carried out under the direction of the Agricultural Department of the U.S.A. have shown that currents set up by zinc and copper plates placed in the soil near the plants and connected by wires have much increased the yields of tomatoes, peas, beets, turnips, carrots, parsnips, and lettuce; but upon the whole the American experiments suggest that an electrification of the atmosphere produces still better results. Electric light, if shielded properly so as to cut out the ultra-violet rays, gives much



they did not succeed at the time in collecting the separated gases, i.e. oxygen and hydrogen.

The discoveries of Volta and the classical experiments of Sir Humphry Davy placed the new science on a firm basis, though it was not till 1834 that the true laws of electro-chemical action were explained by Faraday. Helmholtz, in 1847, suggested that the heat of chemical reaction in a voltaic or galvanic cell could be entirely transformed into electrical energy, a proposition that was further developed by Thomson (Lord Kelvin) in 1851. Since then further researches by many eminent scientists, particularly Van't Hoff, Arrhenius and Sir J. J. Thomson, have only confirmed the profoundly intimate nature of the relationship between chemistry and electricity.

The chemist has long had his conceptions of the molecule and the atom and of the constitution of matter; but the electrician has now suggested that what has hitherto been described as matter



is its scope confined to the production of inorganic compounds; chloroform, chloral, and iodoform are now being manufactured by its aid, as well as certain dyes. It is being utilised to facilitate the processes of tanning, a current of electricity being passed through the tanning pits



**Electro-Culture.** Scenes at Prof. D. Berthelot's experimental station at Meudon, near Paris. 1. Plant for supplying the electric current. 2. Inspecting progress. 3. French beans grown, left, by electro-culture; right, under natural conditions



quicker and increased yields; lettuce benefiting in so remarkable a way that the system has been adopted commercially in the States for the production of forced lettuce for supplies when the ordinary product is not available. Alternating current would appear to be better than direct or continuous when used to electrify the atmosphere.

In Great Britain important experiments have been carried on for some years, particularly in the S. of Scotland, and have given very remarkable results. The method chiefly employed has been to electrify the atmosphere immediately above the plants by means of a network, or rows, of wire stretched from poles at a height of about 7 ft., through which a current of electricity was passed at a tension of not less than 50 volts. The current is not continuously applied, but is given for an hour or two at a time at regular intervals. In 1916 one acre in a field of nine acres under oats was so treated, with the result that the electrified acre gave a yield of 20 bushels of grain, say 840 lb., over the average yield of the rest of the field; while the yield of straw was increased by over 80 p.c.

Hence it would appear that the possibilities in connexion with electro-culture are very great; but so far it has not been shown that the process is likely to be commercially successful when carried out on a large scale. The cost of the current is considerable, and the cost of installing and maintaining the plant is high. In countries, however, where, owing to abundant water power, electricity can be produced very cheaply, as in Scandinavia, Switzerland, the S. of France, Italy, Tasmania, the northern and western states of America and Canada, and probably India, it is possible that electro-culture could be successfully practised over considerable areas. *See Agriculture; Crops.*

**Electrocution.** American term for death from electrical shock. It is an attempt to combine the old term execution with the word electricity, but it is expressive and has now taken its place in the English language. Electrocution of criminals was proposed with a view to avoiding the more revolting and objectionable features which are necessarily associated with any method of hanging, and still more with decapitation, and was first adopted by the state of New York in 1890, the first criminal to be electrocuted being William Kemmler, who suffered this penalty, Aug. 6 of that year. The method has since been adopted by other states of America.

In carrying out the sentence the condemned criminal is seated in a special insulated chair, to which he is firmly strapped. A cap is placed on his head covering his eyes, and containing a metal plate which forms an electrode of the electric circuit. The criminal's head is shaved sufficiently to permit a firm and close contact to be made; the other electrode, another metal plate, is strapped to the leg; the current thus passes through the whole body, and while three shocks are usually given, there appears to be no doubt that on the passing of the first shock, which is only of two or three seconds duration, death is instantaneous and quite painless. The strength of the current used varies from 1,800 volts down to 200 volts. *See Capital Punishment.*

**Electrode.** Term applied to the terminals of an electric cell. Faraday distinguished the one by which the current enters the cell as the anode, and the one by which it leaves the cathode. In an electro-plating bath, the articles being plated constitute one of the electrodes of the bath. The term is also applied to the two carbons of an electric arc lamp and the terminals of an electric furnace, where one may be a rod of carbon, and the other the metal container of the furnace cell.

**Electro-deposition.** This subject is considered under three heads: electro-plating or electro-gilding, in which one metal is permanently deposited on another, either for protection against wear or corrosive action, to give a cheaper metal the appearance and some of the properties of a more valuable one, or for ornamentation; secondly, electro-typing, in which a metal is deposited on a surface from which it is afterwards removed; and thirdly, electro-metallurgy, where metals are refined by causing a pure element to be deposited on a metallic surface while foreign elements are rejected in an electrolytic bath. The physical action on which all these processes depend is described under electrolysis, while the processes themselves are dealt with under their respective headings.

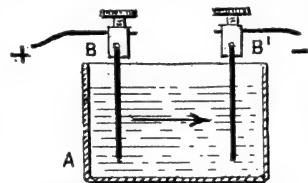
**Electrodynamics.** Term used for the study of the laws of electricity in motion. It first came into prominence through A. M. Ampère's treatise and investigations in 1820, when he laid down the fundamental laws which govern the science. He announced that parallel conductors containing electric currents flowing in the same direction attract one another, and repel when the current is flowing in

opposite directions. *See Current, Electric.*

**Electrokinetics.** Term applied to that branch of the science of electricity which treats of electricity in motion or current electricity, as distinguished from electrical charges merely, which are the sphere of electrostatics. It is a modern form of the older term *electrodynamics*.

**Electrolifer.** Name for a pendant or type of hanging fitting for use with electric lamps. *See Lighting, Electric.*

**Electrolysis.** Decomposition of liquids by electric current. The liquid which undergoes such action is described as an electrolyte. In the case of water it may be entirely decomposed into its two elements, oxygen and hydrogen, the gases being liberated at opposite sides or ends of the apparatus—a cell—in which the operation is carried out. In the case of solutions—such, e.g., as sulphate of copper in acidulated water—the decomposition may be only partial, while under suitable conditions, though decomposition goes on, the state of saturation



Electrolysis. Diagrammatic view of cell for decomposition of liquids by electric current. *See text*

of the solution will be maintained constant.

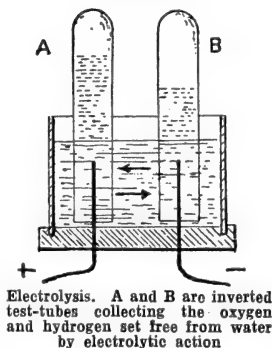
The elements necessary for the exhibition of this phenomenon are shown in the accompanying diagram, in which A is the container, which must either be of a material which is non-conducting electrically or be insulated so that the current of electricity will not pass through it, while B, B' are two conductors immersed in the liquid, each being provided with an arrangement by which it may be connected to a source of electricity. The combination constitutes a cell. The current enters the cell at B, which thus becomes the positive pole or anode of the element, and, after traversing the bath, escapes at B', which is thus the negative pole or cathode, these poles being distinguished by + and — symbols.

If the conductors be two strips of platinum and the liquid water, then, when the current passes, oxygen is liberated at the surface of the anode and hydrogen at the surface of the cathode. The two gases may be easily collected by an



arrangement indicated in the diagram, which represents the original voltameter. A and B are inverted glass test tubes, each having introduced into it at the bottom one of the electrodes. The tubes are first filled with the electrolyte—the water, which is usually slightly acidulated to facilitate the action—and when the current passes, the gases which are released at the surfaces of the electrodes rise to the top of the tubes and displace the liquid. Two notable points are to be observed here: the gases collect separately, and no action whatever is apparent in the body of the bath between the two tubes. But, obviously, when oxygen in the one tube is set free, hydrogen must be liberated at the same instant; the latter does not, however, collect side by side with the oxygen in the tube where it is separated, but by some invisible action passes out of that tube across the bath and appears in the other tube. Similarly, there must be a migration of the oxygen from the hydrogen collecting tube back to the oxygen tube. Thus one of the elements separated travels with the electric current and the other against it; to the former Faraday gave the name *cation*, meaning that which goes down, and to the latter the term *anion*, or that which goes up. No theory yet propounded fully explains the phenomenon indicated.

The phenomenon of electrolysis is not only profoundly interesting from the purely scientific point of view, but it has received industrial applications of the first importance. Electro-metallurgy depends largely upon it, and electro-chemistry wholly. The phenomenon may not, however, be always beneficial. In industrial practice the electric current is generated and caused to flow through the cells by means of a dynamo; but a current may be induced in the cell itself, as in the ordinary voltaic or galvanic batteries, by the employment of two dissimilar metals immersed in a suitable electrolyte. A current may even be set up between two metals of the same kind, provided there be a slight difference in their molecular or chemical structure. Such a current may be very slight, but still sufficient to set up electrolysis if other conditions are favourable. Hence, in the case of machinery or metal structures immersed in water, or in solutions, we may have all the conditions necessary to set up electrolytic action and decomposition. See Cell; Electro-Chemistry; Electro-Metallurgy; Voltameter.



**Electrolyte.** Term given by Faraday to a substance capable of being electrolysed. It is thus the term by which the bath of an electrolytic cell is known; it may be either a solution such as a dilute acid, or of a metallic salt such as sulphate of copper, or it may be a mass of molten metallic compound. See Electrolysis.

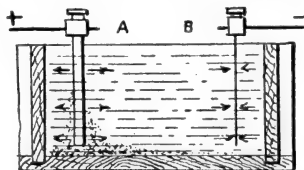
**Electro-Magnetism.** Term used for the branch of science which deals with the connexion between electrical and magnetic phenomena. In 1819 Hans Christian Oersted (*q.v.*) discovered that a wire conveying an electric current is surrounded by a magnetic field, and that a freely moving magnetic needle sets itself at right angles to the wire carrying the current. Oersted's discovery was followed by the researches of D. F. J. Arago and A. M. Ampère and others, but it remained to Michael Faraday (*q.v.*) to show how to obtain electricity from magnetism, and thereby lay the foundations of the modern dynamo and the extensive electrical industry of the present day. See Dynamo; Electricity; Magnetism.

**Electro-Metallurgy.** The most important advance in metallurgy since the development of the Bessemer and Thomas-Gilchrist processes is represented by the application of electricity to the extraction of metals from their ores, and to metal refining. In its broad sense the term electro-metallurgy covers the entire field of the electrical treatment of metalliferous ores and the working of metals by electricity, and thus includes electro-plating, the use of the electric furnace, and electric welding, all of which subjects are treated under their respective headings.

Electro-metallurgy is an entirely modern art which sprang into life after the discovery by Volta of the galvanic cell in the first year of the 19th century. Three different types of processes occur in this branch of metallurgy; first, those

in which the action is purely electrolytic, *i.e.* does not depend on any heating effect of the electric current; secondly, those in which electrolytic action and heating are combined; and thirdly, those in which the effect desired is brought about solely by the heat developed by the electric current.

The first class of these processes is well represented by the electrolytic refining of copper, by which the larger portion of the metallic copper of the world is now produced, nearly the whole of the production of the U.S.A. being so treated. The principle of the process has been explained in the article electrolysis; in practice the material operated upon is either "blister" copper or converter



Electro-Metallurgy. Diagrammatic view of copper-refining vat. See text

copper (*see* Copper). Both contain considerable impurities, including gold or silver, and usually some of each, and the treatment may be either chiefly a pure refining operation or a process for the recovery of the precious metals, which are frequently present in sufficient quantities to pay for the cost of the entire treatment.

The operation is carried out in large wooden vats as indicated in the accompanying illustration, where A represents a plate of the crude copper to be refined (the anode), and B, a very thin plate of the purest copper available, usually electrotype copper (the cathode). The bath in which the plates are suspended (the electrolyte) is a solution of copper sulphate in water acidulated with sulphuric acid, the whole forming an electrolytic cell. The electric current from a dynamo enters the cell at +, passes through the plate A, across the bath, up the plate B, and out at —. The current decomposes the solution, throwing out the copper which is deposited in a practically pure condition on the cathode, the thin copper plate. At the same time the plate of crude copper begins to be broken down; the copper goes into solution taking the place of that removed from the solution and deposited on the cathode; any iron and zinc present in the crude metal will also be dissolved; but the gold, silver, and frequently other metals present, while

set free by the action, will not be dissolved, but will settle to the bottom of the vat in the form of slime.

The action goes on so long as there is any copper left at the anode and the current is continued, or until the bath becomes "sick" with the dissolved impurities, when the current is cut off, the bath allowed to settle so that all the gold and silver may go down, the liquid carefully decanted, and the slimes removed for separate treatment for the recovery of the precious metals. The cathode will have grown in thickness by the deposition of pure copper, and is removed for further treatment because, while it contains only minute traces of foreign substances—perhaps 4 or 5 parts in 10,000 parts of the metal—its physical condition is too spongy to allow it to be sent directly into the market. It is, therefore, melted and cast into ingots, and appears in commerce in that form as electrolytic copper. The solution, loaded as it is with impurities, is usually thrown away.

The refining process is slow; it cannot be hastened beyond a certain limit without detriment to the quality of the finished metal; the crude copper plates may weigh anything from 200 lbs. to 600 lbs. each, and the entire operation may require several weeks' time. A large refinery (there are now establishments turning out 50,000 tons of refined copper a year) contains a considerable number of cells which are formed into batteries, the cells in each being connected in series. In addition to the simple type of cell shown in the diagram, a more complex form is also used, in which a number of plates are suspended side by side, the crude and the pure plates alternating. The process is of great importance not only because it is a highly convenient method of obtaining copper, and economical especially where cheap water power is available for the development of electricity, but because of the remarkable purity which may be given to the finished metal, which makes it peculiarly suitable for electrical work.

"Base bullion," i.e. gold or silver collected in a mass of lead, is also refined by this process. The bullion is cast into thin plates, which are enclosed in muslin bags and made the anodes of a cell; the cathode is a thin sheet of pure lead, and the bath is a solution of lead sulphate in sodium acetate. The lead of the bullion passes into solution, and then deposits on the lead cathode, leaving the gold and silver, and perhaps other metals,

in the muslin bag in a form ready for subsequent treatment. The process in this instance may be regarded as a lead refining operation. Zinc is also refined on similar lines.

The Elmore process (*q.v.*) is a particular application of this principle of electro-metallurgy. The recovery of gold from a cyanide solution in the Siemens' modification of the McArthur-Forrest process is another example of this type of electro-metallurgical operations, only in this instance it is a case of the extraction of a metal from its ores, and not of refining. It has been proposed to apply this system to the extraction of other metals, particularly copper, from its ores, and while this has not been done on any considerable scale, the trend of metallurgical science is strongly in that direction, and there can be little doubt that this development will come in due course, particularly in regions where cheap water power, as in Tasmania, is available contiguous to the source of the ores. Mount Lyell mine already uses the electrolytic process in the treatment of its crude copper from the Bessemer converter.

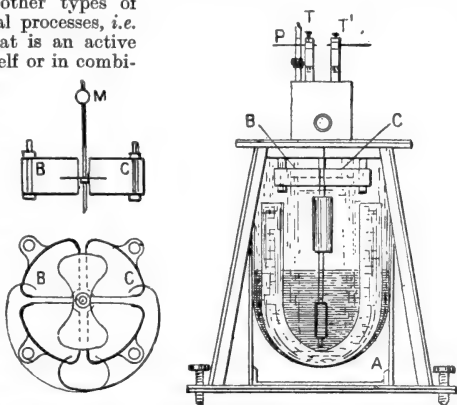
For the two other types of electro-metallurgical processes, i.e. those in which heat is an active agent either by itself or in combination with electrolytic action, what is essentially a furnace, and not merely a cell or battery of cells, is required. See Aluminium; Furnace.

### **Electrometer.**

Instrument for measuring electricity. It is to be distinguished from indicators, such as ampere meters (ammeters) and the volt meter, and also from electric meters, although all these instruments are used to measure electricity. These latter instruments, however, are the more permanent, practical instruments of industrial electricity power development and commercial supply. The electrometer, while it is continually being used for practical purposes and for certain determinations is indispensable, is more an instrument of research and of special and delicate tests and indications. Its purpose is to measure difference of potential, that is to say, electric pressure; it may be said to be a highly developed electroSCOPE.

Various forms of electrometers have been proposed. Interesting designs are associated with the names of Dellmann and Peltier, but the first really effective instruments were introduced by Lord Kelvin, when Sir William Thomson. The instruments almost universally in use to-day are in all essentials of Kelvin's design. These are mostly two, the first being what Kelvin called the attracted-disk or trap-door electrometer, and the other the well-known quadrant electrometer.

The former consists essentially of a Leyden jar (*q.v.*) containing special provision for keeping its interior dry, in which are placed two parallel disks of metal, one fixed at the bottom of the jar and the other adjustable and suspended over the former in such a way that it can be moved closer to or farther away from the fixed disk as required. The fixed disk has near its centre a hole covered with a thin piece of aluminium constituting the trap-door and the indicator of the instrument. The trap-door is attached to a fine platinum wire, and prolonged so as to have the form of a lever, the arrangement being such that it may be



**Electrometer.** Kelvin's quadrant electrometer, showing instrument as a whole and enlarged views of quadrants and needle. For full explanation see text

attracted by the adjustable disk above it when the electrical connexion is made. The potential difference is determined by the distance apart of the two disks when the trap-door is in a determined position and the current passing. This distance is read on minutely divided scales forming parts of the instrument.

Kelvin's quadrant electrometer is shown in its essential features in the views appended, showing one form of the instrument as a whole, and enlarged views of the quadrants and the enclosed needle. The body

of the instrument is again, in effect, a Leyden jar A, the lower portion of which is filled with sulphuric acid, which serves four purposes—it acts as the inner coating of the jar, keeps the interior dry, and provides means by which the movement of the needle may be steadied, and by which the magnetism of the needle is permanently maintained. The outside of the jar is coated with foil in the usual way and the foil connected with the earth.

The jar is a powerful condenser of electricity, and exists to provide what may be called an electric atmosphere so powerful and steady that it will be unaffected by any electricity that may enter the instrument during any test. B, C, are two of the quadrants, the other two being removed in the upper left-hand Fig. so that the needle may be seen. They are secured to the frame of the instrument. The quadrants and the needle are shown on an enlarged scale in the Fig. They are small brass boxes with two open sides and are four in number. Opposite quadrants are joined by a wire, thus making them one electrically. The "needle" is a thin vane of aluminium—the lightest suitable material—with rounded ends as shown, anything in the way of a point which might tend to discharge the electricity of the vane being avoided. The needle is attached to a stiff platinum wire which is suspended by a silk fibre secured at the top of the instrument so that it hangs vertically with the needle floating horizontally as shown. The wire continues below the needle and ends in a vertical vane dipping in the sulphuric acid which serves to steady or "damp" the movement of the needle. M is a small concave mirror attached to the wire, so that it revolves with the needle.

One pair of quadrants is connected with the terminal, T, and the other pair with T'; these are the chief electrodes, and are connected to the two bodies, the potential difference of which is to be determined, one of the bodies being usually the earth. P is the charging electrode by which the jar is charged. When the circuit is completed the needle will turn horizontally in one direction or another, according as to which pair of quadrants carries the higher potential. A ray of light falling on the mirror will be reflected through a narrow slit on to a scale some few feet away as the mirror turns in sympathy with the needle, the intensity of the potential being shown by the degrees over which the reflected ray travels on the scale. Various modified forms of this beautiful instrument are now

in use. The torsion balance is also a form of electrometer. *See* Electroscope; Meter, Electric.

**Electron.** Name given by Johnstone Stoney in 1891 to the "atom" of electricity, that is to say the smallest quantity that can exist by itself or can be transferred from one atom of matter to another. Electricity is supposed to consist of enormous quantities of such atomic particles all of equal dimensions. The electron is negative; and a charge of negative electricity on a body means that there is no accumulation there of electrons. An electron may exist by itself or in association with atoms or molecules of matter; but if there are such things as atoms of positive electricity they are always combined with atoms of matter.

The origin of the conception of the electron may be traced to a lecture delivered by Von Helmholtz in London in 1881 on the electrical theories of Faraday; but it was more immediately developed upon the discovery of the cathode rays of the late Sir William Crookes. The phenomena of these rays, as shown in a vacuum tube (*q.v.*) in which a discharge of electricity is taking place, can be best explained by supposing that, from the cathode of the tube, flights of electric particles or corpuscles proceed at tremendous velocities, all being negatively electrified with equal charges. These particles are electrons. The single charge of a negative ion in electrolysis is believed to be identical with the electron of the cathode rays. The electron has infinitely little weight and dimensions.

The diameter of a molecule of hydrogen is perhaps  $1/42,000,000$ th part of an inch, but it is 140,000 times as big as an electron; while the weight of an atom of hydrogen, the lightest substance of which we have any actual knowledge, is from 1,800 to 2,800 times that of an electron. It will be seen that the electron is a philosophic conception; its value and interest lie in its usefulness in explaining the phenomena of electricity and matter. *See* Electricity; Ion; Radio-activity.

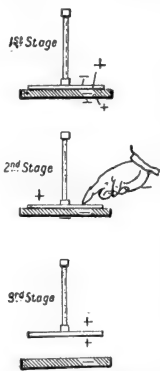
**Electrophone.** Term first applied by a French scientist, M. C. Ader, to a high tension electric sound-transmitting instrument of his design, intended to be used for the purpose of enabling conversation to be carried on through a submarine electric cable. It is now applied to the apparatus used in connexion with an ordinary telephone service for the purpose of enabling one to listen to a concert or theatrical performance or to a public speech which is being carried on or delivered at a considerable

distance away. By its aid a telephone subscriber, in London, for example, who is connected also with the Electrophone Exchange, may sit in his drawing-room in the evening and listen to any one of a number of theatrical performances going on at the theatres, and be switched off from one and put on to another as he may desire. The transmitters are usually fitted in sets of four near the footlights of the stage or platform, or in front of the speaker at a public meeting.

**Electrophorus.** The simplest device which has been introduced for the development of electricity. It was invented by the Italian scientist Alessandro Volta in 1775, the general arrangement being shown in the accompanying illustration. It consists of a metal dish about a foot in diameter, called the sole-plate; a layer of some good non-conducting substance, glass, indiarubber, ebonite, or pitch may be used, but the usual material is resin; a metal disk, called the cover, rather smaller than the sole-plate; and a glass rod attached to the disk and serving the purpose of a handle by which it may be lifted.

In using the apparatus the parts are usually first warmed to ensure that they are dry, and the resin base is then struck or rubbed with a piece of cat's-skin or other fur, or a piece of dry woollen cloth, and is thus electrically "excited," the charge of electricity developed upon it being negative. The metal upper plate is then placed on the resin base; it does not, however, receive from the resin any direct charge of electricity, but by induction develops a charge of positive electricity on the surface of the disk where it is in contact with the resin and a charge of negative electricity on the upper surface of the

disk, as shown in the sectional illustration. If now the upper surface of the disk be touched by the finger and thus put into electrical contact with the earth, or "earthed," to use the technical expression, the negative charge of the disk will pass to earth leaving the disk positively electrified throughout, and if now lifted away



Electrophorus, the simplest electricity maker. For explanation see text

from the resin it will give a spark if the knuckle or any conductor be brought near it.

The sole-plate performs an important function by the mutual induction which takes place between it and the upper plate or cover. When the latter develops its positive charge on being put in contact with the earth, the sole-plate receives a corresponding negative charge from the earth, and in this way the original positive charge of the cover due to the negative charge of the resin base may become an appreciable amount. The electrophorus may be worked almost indefinitely, i.e. every time the cover is put back on the base and its surface touched with the finger the action takes place and a spark may be obtained when the cover is lifted.

An arrangement has been devised by which the connecting of the cover with the earth is performed automatically. In this form of the instrument the cover is fitted with a strip of tinfoil which makes contact with the sole-plate when the cover is laid on the resin, so amounting to the same thing as connecting the cover with the earth through the finger. Nothing is created by the action of the electrophorus, although something appears to be. The initial charge of electricity is due to the mechanical energy expended in rubbing the resin, supplemented by the mechanical energy expended in lifting the cover. The influence electrical machine may be regarded as a mechanical electrophorus acting on the same principle.

**Electro-plating.** The deposition of a metal on another substance, usually another metal, by electro-chemical action, either for the purpose of protecting the latter metal from corrosion, as when iron is electro-plated with copper, or for the purpose of giving to a comparatively cheap metal the appearance and some of the properties of one more costly, as when a teapot of Britannia metal is plated with silver. The art is based upon the discoveries or inventions of Volta and Galvani in connexion with electro-chemical action at the end of the 18th century. The first application of those discoveries to plating appears to have been made by Jacobi, at St. Petersburg, who, in 1838, published a description of his process of reproducing line engravings on copper by galvanic action. A similar application was made about the same time in Great Britain by Thomas Spencer, of Liverpool, by whom shortly afterwards the first electro-plating business was started.

The scientific principle upon which the art is immediately based is described in the article on electrolysis. The operation can be carried out on a domestic scale with small and simple apparatus; but when carried out on a commercial scale a large vat or bath is used, constructed usually of stout wood lined with lead or slate, though sometimes asphalt or cement is used, or the vat may be built of enamelled iron. It is usually rectangular in shape, and is fitted with a flange round the top, to which are attached two rectangles made of brass tubing, one being a little larger all round and fixed a little higher than the other, as shown in the illustration. The rectangles, and the vat itself, are insulated both from one another and from the earth.

The outer ring is used to take the current into the vat, and is therefore known as the anode ring; the current passes out through the other rectangle, the cathode ring. The bath is filled with a solution which varies according to the nature of the work to be done. The electric current is furnished either by a dynamo or by an electric battery. The articles to be plated, when of convenient size, are suspended in the solution by means of wires from crossbars resting on the cathode ring; while plates of the metal which is to be deposited on the articles are suspended from similar bars resting on the outer or anode ring. The arrangement enables a considerable number of articles to be placed in one vat together with an appropriate number of anode plates, which may be disposed along the brass rectangle as most convenient.

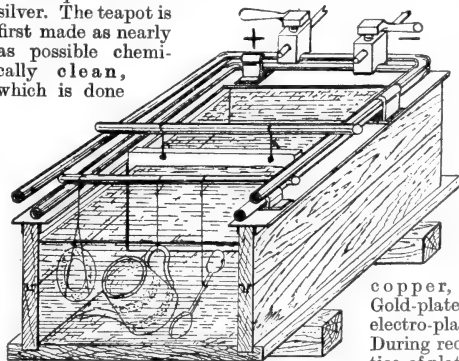
A simple example will serve to illustrate the entire process, whatever the metal that is to be deposited. Let it be supposed that a teapot of pewter or other alloy is to be plated with silver. The teapot is first made as nearly as possible chemically clean, which is done

by first boiling it in an alkaline solution to remove grease, washing freely in water, dipping in a nitric acid solution, washing again, after which it is "quickenened" by dipping in a solution of nitrate of mercury in order to deposit a film of mercury on the metal, which assists the deposition of the silver. The wire to suspend the teapot in the bath is attached immediately after the dipping in the mercury solution in order that the teapot need not be again touched with the hands. The teapot is suspended in the vat from one of the crossbars of the cathode ring, as shown in the figure. The solution is prepared from cyanide of potassium and cyanide of silver precipitated from nitrate of silver, in water. It contains 1 oz. of silver to the gallon.

The anode plate is of commercially pure silver; it is, of course, connected with the positive terminal of the dynamo or battery. When the current passes, the silver in the bath is thrown out of solution and deposited on the teapot, while at the same time an equal amount of silver is dissolved off the anode plate, and, entering into solution in the bath, takes the place of that deposited on the teapot. The process goes on so long as the current is maintained, until the anode is entirely dissolved or until as much silver has been deposited on the teapot as is desired, when it is stopped. The time occupied ranges from two hours to twelve or even longer, according to the work to be done and the thickness of the deposition or plating required. The amount actually deposited on such an article as a teapot is about  $1\frac{1}{2}$  oz. per square foot of surface covered, the thickness of ordinary writing-paper. The teapot, as it leaves the bath, has a fine granular-looking surface of chalky whiteness. The smooth, bright finish of the shops is given by polishing with wire

brushes kept moist by stale beer, after a thorough washing in plain water, dipping in boiling water, and drying in not sawdust.

While silver is the chief metal used in electro-plating, others commonly employed are copper, nickel, and gold. Gold-plate is usually silver electro-plated with gold. During recent years the practice of plating iron with copper has greatly developed;

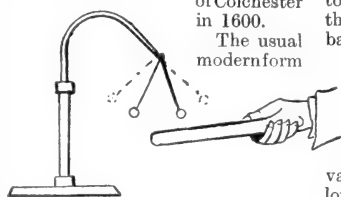


Electro-plating. Bath showing how articles are electro-plated with silver

while the use of nickel-plated articles both of ornament and utility is rapidly extending. The process is precisely the same as that which has just been described in the case of the teapot; the only differences being in the solutions and in the anode plates employed, which must be prepared according to the metal to be deposited. In some cases a preliminary plating is given to promote the deposition and adhesion of the final plating metal. Thus, when iron or steel articles are to be nickel-plated they are first given a coating of copper. Such nickel-plated articles are now largely used for military weapons, household utensils, and parts of bicycles, motor-cycles, and motor-cars. Other metals occasionally deposited include tin, on iron castings; and iron, on engraved copper plates or on electrotypes to give a harder surface so as to permit a greater number of impressions to be taken. See Electrolysis.

**Electroscope.** Term given to an instrument universally employed in the study of electricity for the purpose of determining whether a body is electrified or not, and if so, the character of the electrification, whether positive or negative. In its simplest form it consists of two small balls of pith suspended by silk threads from the arm of a metal stand, as shown below. An almost equally simple form is represented by the balanced needle, similar to the needle of a mariner's compass, devised by Dr. Gilbert of Colchester in 1600.

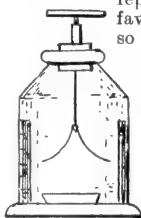
The usual modern form



Electroscope. Simple pith ball electroscope

electroscope consists of a glass bell jar commonly fitted with a brass ring round the bottom or fitted to a wooden base so as to be easily removable. The jar has a stopper of ebonite in which is fitted a stout brass wire with a removable plate or ball at the top, and from the bottom of which two strips of gold or aluminium leaf depend. Opposite each strip and within reach of its end is a strip of tin foil attached to the interior surface of the jar. To ensure the dryness of the interior of the jar when very delicate determinations are to be made, a shallow dish containing sulphuric

acid may be placed within. A glass rod electrically excited by having been rubbed, if brought near the instrument, will cause the leaves to repel one another; in favourable conditions so sensitive is the instrument that the leaves will begin to move apart while the glass rod is several feet away. What happens is that the electricity on the rod attracts the opposite kind into the plate or knob of the electroscope and repels the same kind into the leaves, which fly apart in accordance with the well-known law that like electricities repel and unlike attract.

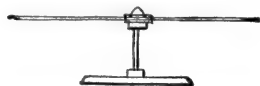


Electroscope. Modern form of gold leaf electroscope

pellets the same kind into the leaves, which fly apart in accordance with the well-known law that like electricities repel and unlike attract.

In determining the particular kind of electricity on an object, the electroscope is first charged by touching the knob or plate with a glass rod that has been rubbed with silk, which causes the leaves to diverge under the influence of positive electricity. If then the body whose character is to be determined be brought near the plate and the leaves diverge still further, the body is electrified positively; if the leaves close, it has a negative charge. The strips of foil on the sides of the jar are used to prevent the leaves from being damaged by the violence with which they are repelled or from adhering to the sides of the jar. The instant they touch the strips of foil they lose their charge to the earth, and fall back into their normal positions.

In Volta's condensing electroscope the normal plate of an electroscope is enlarged and a second is prepared to rest upon it as shown; the under surface of the latter is well varnished to insulate it from the lower; the upper surface of the latter may also be varnished. The two plates make a condenser. In using the instrument one or other of the plates is charged by means of the body to be tested while the



Electroscope. Balanced needle type invented by Dr. Gilbert of Colchester

other is connected to earth; they thus receive charges of opposite kind. If now the upper plate be raised the charges become intensified in accordance with the principle of the electric condenser, the one becoming more strongly

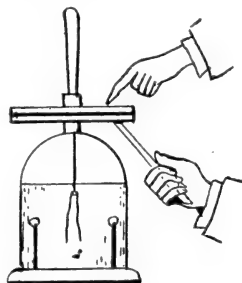
negative and the other more strongly positive, with the result that an extremely weak charge will be detected by the divergence of the leaves.

By means of this instrument Volta demonstrated that the contact of dissimilar metals in air gave rise to opposite kinds of electrification. The electroscope has rendered valuable service in the study of radio-activity and of the characteristics and properties of atoms.

**Electrostatics.** Term applied to that branch of the science of electricity which is concerned with electricity at rest or with electric charges, and is particularly occupied with the measurement of such charges. The science deals alike with the most elementary facts of electricity, such as the phenomena exhibited by a rubbed glass rod, and with the profound problems associated with the electrical relations of atomic particles.

Electrostatic machines are machines for the conversion of mechanical work into electric energy and are of two kinds, frictional and influence machines. Ramsden's plate electrical machine belongs to the former class, and Wimshurst's well-known apparatus to the latter.

**Electrotyping.** Particular form of electro-deposition. It differs from electro-plating in that the metal deposited does not become an intrinsic portion of the article on which it is laid, but is removed



Electroscope. Volta's condensing electroscope

from the latter after it has been deposited; its object is not to encase or permanently cover one metal with another, but to make a copy of a surface. It is largely used for making reproductions of coins and medals and other works of art, and for preparing "electrotypes" for printing, both from typed matter set up in the usual way and from engraved surfaces in wood or metal. Electrotype is the term given to the product of the process.

If a reproduction of a medal is required, and the original is not too

valuable to be risked in the depositing solution, it may be used as the cathode of the operation. It is prepared by having a wire twisted round its edge leaving sufficient length for attaching to the terminal of the electric battery or machine. The face which is not to be copied is embedded in gutta-percha; the face to be reproduced is slightly greased with olive oil by means of a fine hair brush, to prevent a too powerful adhesion of the deposited metal, after which the medal is ready for the bath.

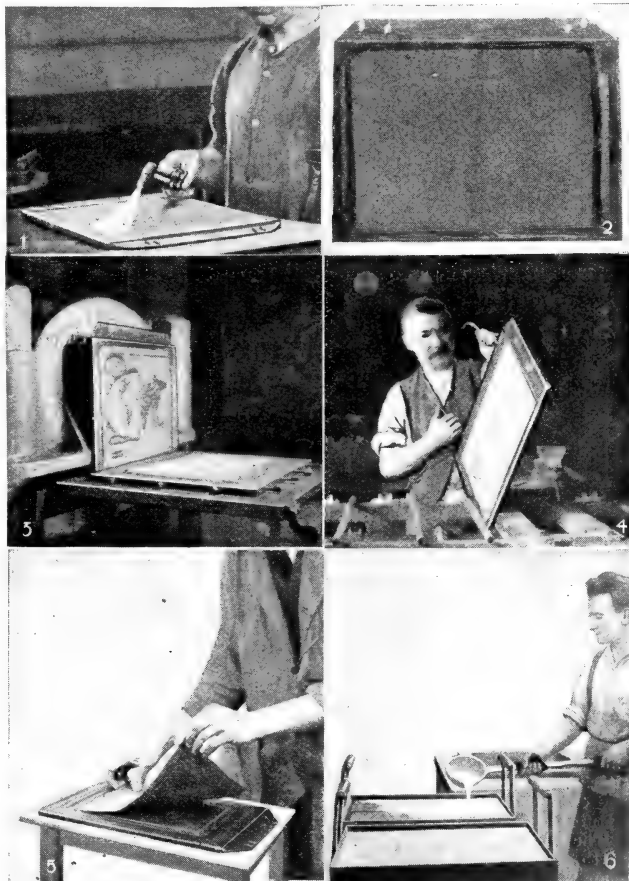
The solution is prepared according to the metal to be deposited, usually copper; after from twelve to twenty-four hours the deposit will have acquired the necessary thickness, probably about 0.015 in., and the medal will be removed from the bath, when the electrotype may be detached. If now a mould be taken of this electrotype, and then another electrotype taken off that mould, the second electrotype will be a duplicate of the face of the original medal. In a similar way a duplicate of the other face of the medal may be obtained, when the two halves may be trimmed and soldered together, making a complete reproduction of the original, which may then be electro-plated, if required, with any appropriate metal. In this way the copies of rare or historic coins and medals in museums have been made.

If the original coin or medal is too precious to be risked in the electrotype bath a plaster cast will be prepared, or, better, a mould in gutta-percha by the aid of pressure, which is indeed precisely the process followed in the preparation of an electrotype from a forme of type. The type is first thoroughly cleaned, dried, and blacklead, one object of the latter being to prevent too firm adhesion of the deposited metal. A shallow tray is filled with a molten mixture of beeswax, turpentine, and plumbago, and the surface, when set, blacklead. The forme of type is then forced into this mixture by pressure and a mould thus produced. This mould is coated all over with plumbago, and has a copper wire embedded in it all round the impression which is to be reproduced in order to increase the conductivity of the mould when in the bath, the wire being connected with the terminal of the vat, in which the mould becomes the cathode.

The anode is a plate of copper and the solution is copper sulphate. A powerful current is used to give a rapid deposition and secure the necessary thickness in the shortest possible time. When the electro-

type is finished in the bath it is removed and separated from the wax bed by melting the latter in hot water, after which it is laid face down on an iron plate, heated, surrounded by a frame of iron bars, and "backing" metal poured over it to a depth of from  $\frac{1}{4}$  to  $\frac{3}{8}$  in. It is then trued up on a steel plate by hammering till perfectly flat, trimmed, and mounted on a wooden block to make it "type high"; or if it is to be used on a rotary printing machine it is bent by rollers to the required curvature. If many impressions are to be taken the electrotype so prepared may be "steel faced" by having a deposit of iron given to it by a separate operation in the electrolytic bath. While still important, improvements in the art of stereotyping have deprived the electrotype of some of the value which at one time it possessed. See Electrolysis; Printing.

**Electrum.** Term at various times applied to different materials. In ancient days it was given to amber, in the Middle Ages to common brass, in modern times to an alloy of copper 8 parts, nickel 4, and zinc 3.5 (sometimes the nickel is 6 parts), a beautiful artificial silver with a bluish tint much used for the manufacture of drawing and other instruments; also to an alloy of copper, zinc, and tin, and to native minerals containing gold and silver, the latter running from 20 p.c. to 50 p.c. An alloy of gold and silver (15 p.c. to 35 p.c. silver) known by this term, of a pale yellow colour, hence the association of the term with amber, was much used by the early Greeks and Romans for ornaments and coins; the earliest coins known were made of it; while rods having 651 parts gold and 334 silver in 1,000 were used as money in Asia Minor. See Metallurgy.



Electrotyping. 1. Smoothing out the wax. 2. Wax mould in position. 3. Wax impression from block. 4. Copper shell on mould when taken from the battery. 5. Peeling copper shell from mould. 6. Pouring in backing of molten lead



**Elegy** (Gr. *elegos*). . . Originally a threnody or lament written in elegiac metre, each couplet in which consisted of a hexameter and a pentameter. The theme of such songs varied, the term being employed for the form rather than the spirit. In modern literature the elegy has mostly been associated with the spirit rather than the form, and has come to be understood as a short mourning, or memorial song, usually a tribute to an individual, but sometimes of a more generally mournful character, as in the case of Gray's *Elegy Written in a Country Churchyard*, 1751.

Earlier poets used the term with wider significance, as when Donne described a series of his amatory poems as *Elegies* and labelled his memorial poems specifically *Funeral Elegies*. Although there were earlier memorial poems of distinction, such as the beautiful anonymous *The Pearl* (14th century) and Chaucer's *Book of the Duchess* (c. 1369), these can hardly be strictly described as elegies owing to their length and treatment. Some of the more notable elegies in English are Spenser's *Daphnida*, 1591 (on Lady Douglas), and Astrophel, 1595 (on Sir Philip Sidney); Milton's *Lycidas*, 1638 (on Edward King); Shelley's *Adonais*, 1821 (on John Keats); Tennyson's *Ode on the Death of the Duke of Wellington*, 1852 (his *In Memoriam* is rather a series of elegiac poems than an elegy); Matthew Arnold's *Thyrsis*, 1867 (on Arthur Hugh Clough); Swinburne's *Ave Atque Vale*, 1867; and William Watson's *Lachrymae Musarum*, 1892 (on Tennyson). See *Poetry*; consult also *English Elegies*, ed. J. C. Bailey, 1900.

**Element** (Lat. *elementum*, first principle). In chemistry, a simple substance which as yet has not been decomposed further by any method of ultimate analysis. The earliest elements, as stated by Aristotle, were not actual substances, but rather properties or conditions of matter. Aristotle called earth, water, air, and fire elements, and the alchemists added others, such as salt, sulphur, and mercury. Boyle first defined an element in its present sense, and Lavoisier compiled the first list of 23 substances which could not be resolved into simpler forms. The number is now 83, and there are possibly others, not included, as the evidence of their elementary nature is not conclusive.

The whole mass of the globe—earth, water, and air—and the planets is made up of these elements and compounds formed of them. The earth's crust, for

example, consists to the extent of about 50 p.c. of combined oxygen, and of silicon, the next most plentiful element, to the extent of about 30 p.c. Some elements, on the contrary, such as radium, are very rare, but the evidence of their elementary character has been satisfactorily established. New elements are discovered chiefly by examining newly found minerals, the spectroscope being employed for the purpose.

The composition of the sun and stars is also determined by the spectroscope. In recent years groups of elements were discovered by Sir William Crookes in the rare earths, by Sir William Ramsay in the atmosphere, and by other workers as the result of the discovery of radium by Pierre Curie. The alchemists strove to transmute baser metals into gold, but, so far as is known, never succeeded in doing so. Sir William Ramsay, however, advanced evidence in regard to the radio-active group of elements to show that transmutation or disintegration actually takes place. It is not unreasonable to suppose that these examples of transmutation in comparatively short periods may by analogy be supposed to be taking place in other elements now regarded as stable. See *Chemical Signs*; *Earth*.

**Elemental Spirits** or **ANGELS OF THE ELEMENTS**. Spirits supposed to rule over the four elements of fire, water, air, and earth. The Jewish Kabbalists and the Gnostics of early Christian days largely developed this idea and introduced a host of minor angels or spirits who had charge of departments of the four great elements, such as wind, rain, etc. Hence arose an elaborate system of angelology not unlike demonology, but generally beneficial or at least harmless in its influence. In the Middle Ages, the spirits of fire were known as Salamanders; those of water as Nixies or Undines; those of air as Sylphs; those of earth as Gnomes. The name Salamander survives as that of a batrachian reptile supposed to be capable of living in fire.

**Elemi**. Resinous exudation from a plant the botanical source of which is still undetermined. Probably the plant is *Canarium commune*. The resin is imported from Manila and is of a pale yellow colour resembling stiff honey in consistence. It has an odour which reminds one of fennel. Elemi was formerly used in medicine as a stimulating application to wounds.

**Elephant** (Gr.-Lat. *elephas*). Family of large, hoofed mammals, surpassing in size all existing animals except the whales. Only two

species now survive, the African and the Asiatic, though several others are known in the fossil state. The feature which distinguishes the elephant from all other mammals is the development of the nose into a long flexible trunk, used by the animal in conveying food to the mouth, and also for drawing up water which is afterwards squirted down the throat.

In respect of dentition the elephant is unique among animals. The incisors, which are only found in the upper jaw and are two in number, are developed in the male, sometimes in the female also, into a pair of long curved tusks. These tusks are quite different from those of the boar and other animals, which are simply large canine teeth. The elephant has no canines. Only two cheek teeth or molars, on each side of both jaws, are ever in use at any one time; but four others exist beneath the gums. These teeth are of great size, and the surface consists of a large number of transverse ridges of enamel. As these molars become worn out they are replaced by the reserve teeth, which grow through the gum.

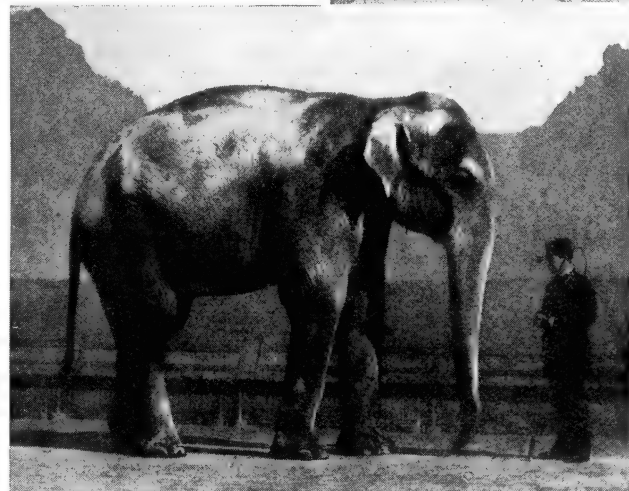
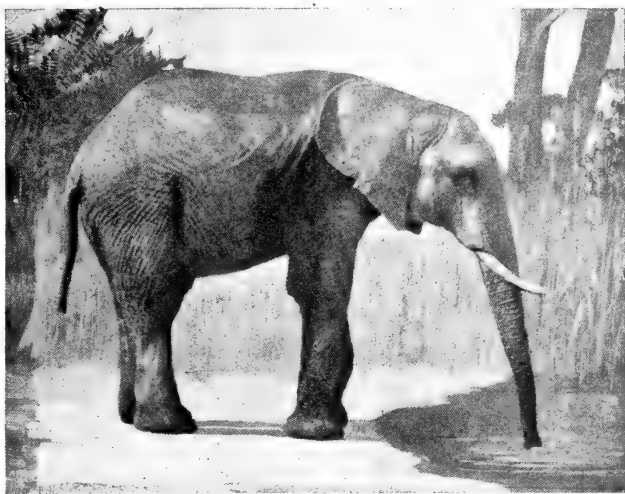
The ponderous body of the elephant is encased in thick wrinkled skin, covered sparsely with coarse hair in the young animal but almost bare in the adult. The legs are massive, and the knee joints are much lower down than in most hoofed animals. This causes the elephant, when lying down, to rest with the hind legs bent much in the fashion of a kneeling man, while the fore legs are thrust out in front.

The head is enormous, and suggests the presence of a large brain. But this appearance is deceptive. The brain is curiously small for the size of the animal and is placed at the back of the head, the huge skull consisting of a mass of bone completely honeycombed by cells, an arrangement which provides for the attachment of the great jaw and trunk muscles without making the skull so heavy as to be a burden.

Elephants are entirely vegetarian in diet, feeding on the leaves and twigs of trees and on grass which they gather by the aid of their trunks. Trees are often uprooted by pressure with the head for the purpose of feeding on the branches. Where force is required, the elephant relies upon leverage with the tusks or pressure with the skull. The trunk is a delicate sense organ for smell and touch, and the animal is always careful to keep it out of the way of rough usage. When an elephant holds a heavy weight it rests it on the tusks or holds it with the teeth, using the trunk only to steady it.

The Indian elephant is easily distinguished by its massive bulbous head, comparatively small ears, and the presence of four nails on the hind feet. It is dark grey in colour, but is occasionally more or less blotched with white. This elephant is rarely much more than 9 ft. high at the shoulder. It has been known to live in captivity for over a century, and in the wild state probably attains a much greater age.

The African elephant has a smaller and narrower head, very large fanlike ears, and only three nails on the hind feet. The molar teeth present differences in structure from those of the Indian species, and the trunk has two finger-like processes instead of one. It also attains a greater height, has longer legs, and a generally less heavy and clumsy appearance. Owing to continuous destruction



Elephant. Specimen of the Asiatic elephant in the Zoological Gardens, London, showing the whitish markings characteristic of this species. Above, African elephant

Photo of Asiatic elephant by Gambier Bolton, F.Z.S.

for the sake of its tusks, the African elephant has been greatly reduced in numbers. This elephant is of more savage disposition than the Indian species. Economically the African elephant is valued for its ivory, the Indian for its qualities as a draught animal.

In 1917 two mature specimens, male and female, of dwarf African elephants were brought to England. They measured about 5 ft. 6 ins. to 6 ft. in height. See illus. facing p. 428.

**Elephant.** Island of the South Shetlands, Antarctica. The most northerly of the group, it lies S.E. of Cape Horn and Drake Strait.

**Elephant, ORDER OF THE.** Danish order of knighthood refounded in 1458 from an earlier institution,

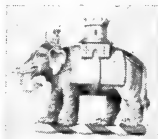


Order of the Elephant, Danish badge of knighthood

light blue watered silk.

**Elephant and Castle.** Design found in early MSS. and in medieval times. Elephants carrying armed men into battle were used in the East from immemorial days. They were first encountered by the

Romans during the war with Pyrrhus in the 3rd century B.C. Polyænus records that an elephant carrying archers in a houdah led the advance when Julius Caesar forced the passage of the Thames near Chertsey in 54 B.C.



Elephant and Castle badge

Caesar Frederick, a Venetian merchant of the 16th century, states that the king of Pegu had 4,000 war elephants with castles on their backs, and the Cutlers' Company, who had a large trade in ivory, adopted the animal so castled as their crest.

**Elephant and Castle.** London tavern in the met. bor. of Southwark,  $1\frac{1}{4}$  m. from Ludgate Hill. The name is now applied also to the district of which it is the centre. The tavern stands at a point from which six thoroughfares radiate: New Kent Road, Walworth Road, Newington Butts, St. George's Road, London Road, and Newington Causeway. See London.

**Elephanta** OR GHARAPUR. Island in Bombay Harbour, India. From 4 m. to  $4\frac{1}{2}$  m. in circumference, it consists of two long hills. It was so called by the Portuguese from a large stone elephant. The island is famous for its caves or rock temples, supposed to date from the 9th century. See illus. p. 1799.

**Elephant Apple** (*Feronia elephantum*). Large evergreen tree of the natural order Rutaceae. A native of Coromandel, it has glossy leaflets and white flowers. The fruit is as large as an apple, with a hard, woody rind containing

seeds embedded in pulpy flesh. The pulp is eatable, and is made into a jelly; it is also useful in dysentery and diarrhoea. The wood is hard and heavy but not durable. The tree exudes a gum from wounds.



Elephant Apple. Leaves, flower, and fruit, showing arrangement of seeds within the fruit

which forms a constituent of what is known as Indian gum-arabic.

**Elephantiasis** OR BARBADOS LEG. Disease characterised by chronic inflammation of the fibrous connective tissue, resulting eventually in excessive swelling of the leg, scrotum, arm or breast, and less frequently other parts. The condition is due to obstruction of the lymph circulation, most often caused by infection by a parasite worm, the filaria.

The disease, which was recognized in ancient times, probably originated in Asia, and has spread thence to Africa and America. It is now most often seen in India, Ceylon, China, Japan, the Philippine Islands, Fiji, Samoa, many parts of Africa, the S. United States, Central America, the West Indies, Brazil, and Peru. Its distribution is influenced by that of mosquitoes, but the exact conditions governing its transmission have not yet been determined.

Elephantiasis frequently begins with high fever, pain in various parts of the body, and swelling of the extremities. The swelling may abate after the first attack, but in subsequent attacks the limb becomes more and more swollen until eventually it may attain an enormous size. Treatment is not very satisfactory. Castellani and Chalmers state that the best results are obtained by keeping the patient in bed and injecting fibrolysin daily for three to six months.

**Elephantinē.** Island in the Nile at Assuan, Upper Egypt. Marking the S. limit of ancient Nile navigation, it contained the Old Kingdom frontier station, Abu, or elephant town, an *entrepôt* of the Sudanese ivory trade. On the W. Nile bank opposite are rock-hewn

tombs of Old and Middle Kingdom governors. Under Thothmes III, Rameses II. and other kings, its governor controlled the Assuan granite quarries. During the Persian supremacy there was a Jewish garrison, with a temple of Jehovah here. Aramaic papyri, recovered 1901 and 1906-8, elucidate 5th century life. An interesting object is the nilometer, recently renovated, which dates from the Ptolemaic period.

**Elephant Seal** (*Macrorhinus*). Large species of seal. It is called sea elephant because the nose is prolonged into a short proboscis in the adult male. Large specimens attain a length of 20 ft., and the girth is about equal to the length.



Elephant Seal, or Sea Elephant, a large marine animal found in the Indian and Southern Oceans

These animals are found only in the Indian and Southern oceans.

**Elephant's-foot**, HOTTENTOT BREAD, OR TORTOISE PLANT (*Testudinaria elephantipes*). Perennial climbing herb of the natural order Dioscoreaceae. It is a native of S. Africa. The huge rootstock (as much as 4 ft. across) is covered with a corky bark, ultimately



Elephant's-foot. Leaves and flowers of the S. African climber

cracked into angular protuberances. It contains a store of starch, eaten by the Bushmen. The slender stems climb to a height of 30 ft. or 40 ft., and bear small heart-shaped leaves and sprays of tiny greenish-yellow flowers.

**Elephant Shrew** (*Macroscelides*, long-legged). Name sometimes given to the jumping shrew, owing to its long and trunk-like nose. They are small African in-

sectivores, and have the hind legs so long in proportion to the body that they look rather like miniature kangaroos. They are nocturnal in habit, feed mainly on insects, and proceed by a series of leaps.

**Elephas Primigenius** OR MAMMOTH. One of the extinct elephants, almost identical with modern elephants, but differing in greater development of curly tusks, and in the woolly hair. It was far more widely distributed than the modern elephant, remains being found in America, the bed of the North Sea, the Thames Valley, within the Arctic Circle, and in the frozen earth of N. Russia. See Mammoth.

**Eletz.** Town in S. Russia, in the govt. of Orel. It stands on the Sosna, 105 m. E. of Orel, at the junction of several rlys. There are leather, flour, soap, stearine, and candle factories, tanneries, and iron foundries. Considerable trade is done in grain, cattle, leather, and iron. The chief industry is linen weaving; the women are expert lace makers. Eletz, mentioned in 12th century chronicles, was long the chief

town of a principality conquered by Tamerlane. Pop. 58,000.

**Eleusine.** Genus of grasses of the natural order Gramineae. Natives of warm regions, they are distinguished by the flower spikes being arranged finger-fashion at the top of the stem. As a genus they are of little importance, but *E. coracana* is grown in Japan and on the Coromandel coast, its large seeds being used as corn.



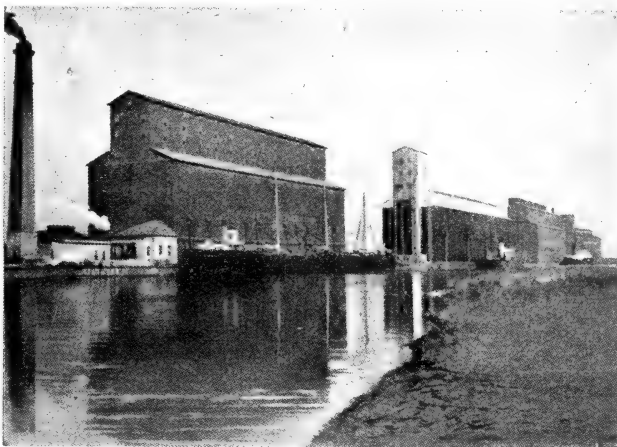
Eleusine, showing the finger-like flowers

**Eleusinia** OR ELEUSINIAN MYSTERIES. Festival held in honour of the nature goddess, Demeter, more especially that held at Eleusis in Attica in Sept. each year. Only those who were properly initiated were allowed to take part in the rites. The precise nature of the rites is not known, as they were never divulged in ancient times, though the festival continued till nearly A.D. 400. They were doubtless symbolical of the death of Nature in autumn and its rebirth in spring. See Demeter: Mystery

**Eleusis.** Ancient city of Attica. Said to have been founded by Triptolemus (*q.v.*), it stands on the Bay of Levsina, 12 m. N.W. of Athens, with which it is still connected by the old causeway called the Sacred road. It was the chief seat of the worship of Demeter, in whose temple the Eleusinia were performed. During the Persian Wars this great temple was destroyed, but soon rebuilt, additions being made by Pericles, and later by Demetrius Phalereus. Still further enlarged by the Romans, the city continued intact until it was destroyed by the Goths under Alaric in A.D. 396. Eleusis was the birthplace of the great tragic poet Aeschylus, and after the Peloponnesian War its citadel was seized by the remnants of the Thirty Tyrants (*q.v.*). Though the site is strewn with ruins, little of the temples but two porches remain, with a sacred well, a council hall, and lesser temple. Eleusis, later Eleusin, is now represented by the village Levsina, lying 15 m. by rly. N.W. of Athens, chiefly inhabited by Albanians.

**Eleuthera.** Island of the Bahamas. It is 50 m. N.E. of New Providence, and is separated from Great Abaco by the Providence Channel. Long and very narrow, it is fertile and produces cascarilla, oranges, pineapples, onions, and tomatoes. The capital is Governor's Harbour, with a good, fortified harbour. Area, 235 sq. m. Pop. 6,533.

**Elevation.** In architecture and engineering, the vertical view of a building, machine, or other object drawn to scale, but ignoring per-



**Elevator.** Grain elevator on the Canadian Pacific Railway at Fort William, Lake Superior, Ontario

spective. In astronomy it is the angular height above the horizon of a star or other celestial object; and in gunnery the angle between the axis of the gun and the horizontal. *See* Gunnery.

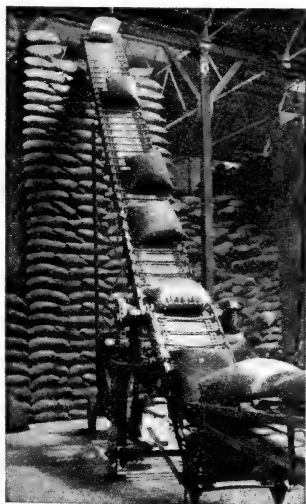
**Elevator** (Lat. *elevare*, to lift up). In aeronautics, the flap, or hinged controlling surface, which governs the speed of the aeroplane to which it is fitted by raising or depressing the nose of the machine. It is usually mounted at the rear of the machine, and is operated by the fore and aft movement of the control lever. The elevator is also employed in steep banks or sharp turns to bring the machine round. When the elevator is moved downwards by pushing the control lever forward it presents its surface to the air stream at an angle which sets up increased resistance. A lifting effect is thus produced at the tail of the machine where the elevator is fitted; the machine rises at the tail and tilts downwards at the nose. To make the aeroplane rise, the elevator is tilted upwards. The air resistance is now felt at the upper surface of the elevator. It is consequently pressed downwards, and with it the tail of the machine, while the nose rises. *See* Aeroplane.

**Elevator.** American name for a grain silo or store. It contains a number of deep vertical bins, circular, hexagonal, or square in plan, and constructed of steel plates or reinforced concrete; and is equipped with elevating, cleaning, distributing, and discharging apparatus. On arrival the grain is emptied by means of a bucket or pneumatic elevator into a receiving chamber, whence it passes downwards, through an automatic weigher and a cleaning machine, to

a bucket elevator, which carries it to the distributing floor at the top of the building. Here it is received on a system of belt conveyers and is rapidly delivered into one of the bins. These have conical bottoms and are self-emptying. Trucks are run under them and loaded directly or the grain is transferred to ships by belt conveyers, or through spouts. The largest silos have a capacity of several millions of bushels; will take in 40,000–50,000 bushels an hour, and discharge 100,000 bushels and upwards in the same time. A lift for goods or passengers is sometimes called an elevator.

**Elf.** Small being common to the folklore of most countries of northern Europe. Grimm says that an elf comes as much short of human size as a giant towers above it. The white elves are well formed and symmetrical, the black ugly and misshapen. The latter mostly work underground at their forges, and, like their white brethren on the earth's surface, take pleasure in teasing mankind. If left undisturbed they maintain peace with men and delight in doing them service; but if interfered with retaliate with mischief.

Elves are generally gifted with wisdom and sometimes with divination. A common characteristic of the elf was his power of becoming invisible, frequently by means of a cloak or cap; thus, Siegfried in the Nibelungs Song has an invisible cap which he obtains from Alberich, the elf-king. In most stories elves are peculiar to the earth and underground, and are scarcely distinguishable from the forge-working dwarfs and gnomes of the mountains; while in others they are associated with light and flowers,



**Elevator.** Interior of a grain elevator; belt conveyer stacking sacks of grain

and blend in the more general term of fays and fairies. There have been attempts to link the elf tradition with a primitive northern people of small stature.

Flint arrow-heads were called elf-arrows or elf-bolts from an idea that they were weapons of these little people. They are worn as amulets (Ancient Etruria, Italy), and reproduced for sale (Mecca). In Ireland water poured over them is given to cattle. Other things associated with them were elf-locks, hair matted together by them in mischief, or as they wore it; elf-child, a changeling; elf-knot, the hole in a piece of wood from which a knot has fallen, being the hole through which an elf can pass; night-elf, the nightmare; elf-light, will-o'-the-wisp; elf-lay, an enchanting fairy song. See Folklore.

**Bibliography.** The Fairy Mythology, T. Keightley, rev. ed. 1847; Teutonic Mythology, J. L. C. Grimm, Eng. trans. from 4th German ed. J. S. Stallybrass, vol. iv, 1888; Testimony of Tradition, D. MacRitchie, 1890.

**El Fasher.** Capital of Darfur, in the Anglo-Egyptian Sudan. It is about 200 m. N.N.W. of El Obeid, the W. terminus of the Sudan Government rlys., and is a caravan centre with considerable trade.

**Elgar, Sir Edward** (b. 1857). British composer. Born at Broadheath, Worcestershire, June 2, 1857, the son of an organist, he was largely self-taught as a musician. He gained valuable experience in connexion with the local musical societies, his first success being the production of King Olaf at Hanley in 1893. In 1899 his Enigma orchestral variations and his Sea Pictures added much to his reputation, which was firmly established by the performance of The Dream of Gerontius (Birmingham, 1900). His other important works are The Apostles, The Kingdom, two orchestral symphonies, and a violin concerto. In 1904 Elgar was knighted, in 1911 was given the Order of Merit, and in 1924 was appointed Master of the King's Music.

**Elgin.** Royal and mun. burgh and county town of Elginshire, Scotland. It is 80 m. by rly. N.W. of Aberdeen by the G.N.S. and Highland Rlys.; Lossiemouth, its port, is 5 m. to the N. Elgin has ruins of a beautiful cathedral, founded



Elgin arms

in 1224, burnt down in 1270, rebuilt, and again destroyed by fire in 1390 by the Wolf of Badenoch. Restored to greater magnificence, it was wrecked by the fall of the central tower, 1711.

Remains exist of the bishop's palace, a royal castle, and monas-



Elgin, Scotland. The western towers of the ruined cathedral, viewed from the chancel end

teries of Blackfriars and Greyfriars; the Greyfriars chapel was restored by the third marquess of Bute. Woollen manufacture, ironfounding, and tanning are industries. A park of over 40 acres was presented by G. A. Cooper in 1903. Market day, Fri. The shire is more usually known as Morayshire (*q.v.*). Pop. of mun. burgh, 8,656.

**Elgin.** City of Illinois, U.S.A., in Kane co. On the Fox river, which supplies power for the industrial establishments, it is 36 m. W.N.W. of Chicago by the Chicago, Milwaukee, and St. Paul Rly. Dairy farming is an important local industry, and the city has large watch factories and manufactures condensed milk, flour, boots, shoes, and shirts. There are several hospitals and a public library. Settled in 1835, it was granted a city charter in 1854. Pop. 28,560.

**Elgin, EARL OF.** Scottish title held by the family of Bruce since 1633. Sir Edward Bruce, master of the rolls under James I, was made a baron in 1601, and his son Thomas was made earl of Elgin and later an English baron. The 2nd earl was made earl of Aylesbury in 1663. In 1746 the direct line failed, and there was a division of the titles, the earldom of Elgin passing to Charles Bruce, 9th earl of Kincar-

dine, whose successors have borne the double title. Thomas Bruce, 7th earl of Elgin and 11th earl of Kincardine, a general in the army and ambassador at Brussels, Berlin, and Constantinople, is remembered as the collector of the Elgin Marbles (*q.v.*). His son and grandson served the state in various high capacities. The family seat is Bromhall, Fife, the earl's son is known as Lord Bruce, and the earl sits in the House of Lords by virtue of a barony created in 1849. *Pron.* Elg-in.

**Elgin, JAMES BRUCE, 8TH EARL OF** (1811-63). British diplomatist. Born in London, July 20, 1811, son of the 7th earl, whom he succeeded in 1841, he was governor of Jamaica from 1842-46, and governor-general of Canada from 1846-54. He was raised to the British peerage in 1849. In 1857 he was sent as envoy to China to demand reparation for the seizure of the British lorcha Arrow, and on the way out diverted his troops to assist Lord Canning in the Indian mutiny. He negotiated the treatise of Tientsin and Yeddo in 1858, and in China again in 1860 secured the ratification of the treaty of Tientsin. In 1862 and 1863 he was viceroy of India, where he died Nov. 20, 1863. See his Letters and Journals, 1872; Lives, J. G. Bourinot, 1905; G. M. Wrong, 1905.

**Elgin, VICTOR ALEXANDER BRUCE, 9TH EARL OF** (1849-1917). British statesman. Born at Montreal, May 16, 1849, when his father was governor-general of Canada, he was educated at Glenalmond, Eton, and Balliol College, Oxford. In 1863 he succeeded to his father's estates and titles, these including the earldom of Kincardine. With Gladstone he became a Home Ruler, and in the government of 1886 was treasurer of the household and first commissioner of works. From 1894-99 he was viceroy of India. In 1902 he was chairman of the royal commission appointed to inquire into the preparations for the South African War, and later of the one that reported on the ecclesiastical crisis in Scotland, caused by the



Sir Edward Elgar, British composer

Hoppé



9th Earl of Elgin, British statesman

Elliott & Fry



judgement of the House of Lords on the property of the Free Church. In 1905 Campbell-Bannerman made Elgin colonial secretary, but he did not retain this office when Asquith became premier in 1908, refusing then the marquessate offered him; his cautious policy and freedom from partisanship had not been altogether acceptable to the extremists in his party. He died at Broomhall, Fife, Jan. 18, 1917, when his eldest son (b. 1881) became 10th earl of Elgin and 14th earl of Kincardine.

**Elgin Marbles.** Collection of sculptures brought from Greece by the 7th earl of Elgin, while ambassador to the Porte. Keenly interested in the remains of ancient art in Athens and other Greek towns, his first intention was to have accurate drawings of them made, but seeing that they were fast going to ruin, he obtained the Porte's sanction to remove various relics. These consisted largely of sculptures by Pheidias and other great artists from the Parthenon and the temple of Nikē Apteros (Wingless Victory) in Athens. Despite enormous difficulties, including the wreck of the ship conveying the precious cargo to England, the Elgin Marbles (as they were afterwards collectively called) were brought to London in 1806. Added to in later years up to 1812, they were finally acquired for the British nation in 1816 for £35,000, less than half of the sum (£74,000) Lord Elgin had paid to preserve them from total destruction, and are now in the galleries of the British Museum. Lord Elgin was accused of vandalism, and even dishonesty, but

the select committee of the House of Commons appointed to investigate the whole subject entirely exonerated him. *See* illus. p. 643.

**Elgon.** Extinct volcano, 14,097 ft. high. It stands on the frontiers of Uganda and Kenya Colony, 60 m. N.E. of the Victoria Nyanza. The rivers on the W. side drain into Lake Kioga, those on the E. into the Victoria Nyanza. The forest (about 50 sq. m.) on Mount Elgon is little known.

**Eli.** Judge and priest of Israel in the later period of the Judges. Through Samuel, who was in his service as a boy attendant, God indicated his anger at the misdeeds of Eli's sons. When the news came that the Ark of the Covenant had been taken by the Philistines, and both his sons killed, Eli fell back and broke his neck.

**Elia.** Name taken by Charles Lamb. It was that of a clerk in the South Sea House, and was first assumed by Lamb when in 1820 he began to contribute essays to *The London Magazine*. *See* *Essays of Elia*; Lamb, Charles.

**Elibank, BARON.** Scottish title borne since 1643 by the family of Murray, and now merged in that of Viscount Elibank. Patrick Murray, a person of importance in Selkirkshire, where Elibank is situated, and on the Scottish borders generally, was made a baronet in 1628, and a baron by Charles I in 1643. His title passed to his son Patrick in 1650, and then down a line of descendants, of whom George, the 6th baron, became an admiral. In 1871 Montolieu Fox Oliphant (b. 1840) became the 10th baron, and in 1911 he was made a

viscount of the United Kingdom. His eldest son, Alexander, was made Lord Murray of Elibank in 1912, after serving as chief whip of the Liberal government (*see* Murray). Of Viscount Elibank's younger sons, Gideon had a long record of service under the colonial office, and Arthur was chosen M.P. for Kincardineshire in 1908, and was re-elected in 1910 and 1918. The latter won the D.S.O. in the Great War.

**Elie.** Police burgh, parish, and watering-place of

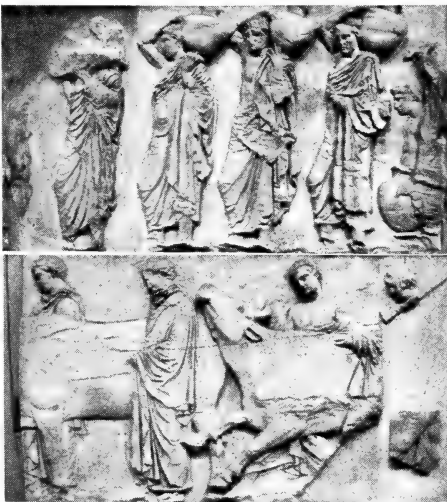


**Elijah.** The prophet fed by ravens in the wilderness

*After the painting by Burne-Jones*

Scotland, in Fifeshire. It is on the N. side of the Firth of Forth, 10 m. S. of St. Andrews and 45 m. by rly. N.E. of Edinburgh. It includes Earlsferry, a royal burgh. It has a harbour and pier, and is a coast-guard station with a flashing light on Elieness. The chief buildings are a church of the 17th century, and the town hall. There are fine golf links. Pop. of parish, 1,147.

**Elijah.** Hebrew prophet. A native of Gilead (1 Kings xvii, 1), he lived in the days of Ahab. He appears to have led a kind of hermit life in the mountains, only emerging at intervals to denounce Ahab and attack the priests of Baal. On Mount Carmel he challenged the priests of Baal to a test of the rival religions by calling down fire from heaven, after which he had to flee from the wrath of Queen Jezebel to Beersheba, where



**Elgin Marbles.** Two views of the north frieze of the Parthenon, now in the British Museum



he seems to have wandered about the desert for six weeks. (

When Ahaziah succeeded Ahab, Elijah warned him that he would die as a result of an accident that he had suffered. Towards the close of Jehosaphat's reign Elijah was still living, for he sent a letter to Jehoram, the king's son. When the end came, we are told that Elijah passed in a chariot of fire into the heavens. Jewish tradition long held that he would reappear before the coming of the Messiah, and the chair of Elijah is still set ready at the Passover meal.

Legend points out Elijah as the founder of the Carmelite Order, and in the Greek Church he is regarded as the patron saint of the mountains. He appears to have had some connexion with the mysterious religious communities known as the "Sons of the Prophets," of which there were a large number in Palestine in his period. In the N.T. he is referred to as Elias.

**Eliot, Sir Charles Norton Edgecumbe** (b. 1864). British diplomatist. He was educated at Cheltenham and Oxford, where he graduated in 1885. Entering the diplomatic service, he served in the embassy at St. Petersburg, 1888-92 and Constantinople, 1893-98. Chargé



Sir Charles Eliot,  
British diplomatist

Lafayette

d'affaires at Morocco 1892-93, Bulgaria 1895, Serbia 1897, he became secretary at Washington in 1898, and was appointed British High Commissioner at Samoa in 1899. Knighted in 1900, he was agent at Zanzibar 1900-4, in which year he retired. He became vice-chancellor of Sheffield University in 1905, and was made the first principal of Hong Kong University in 1912. In 1918 he became commissioner for Siberia, and the following year was appointed ambassador to Japan.

**Eliot, Charles William** (b. 1834). American educationist. Born at Boston, March 20, 1834, he was educated there and at Harvard. In 1854 he became a mathematical tutor at Harvard, and later assistant professor of mathematics and chemistry in the Lawrence Scientific



Charles W. Eliot,  
American  
educationist

School. After studying in Europe he was appointed in 1865 professor of chemistry in the Massachusetts Institute of Technology. In 1869 he was chosen president of Harvard, being made president emeritus on his retirement in 1909.

At Harvard Eliot did great work. He improved its teaching by adopting reforms from Europe, and

in other ways widened the aims of the university. He became known as a writer on education and as an advocate of international peace. In 1913 he was offered the post of U.S. ambassador in London. His books include *Educational Reform, 1898*; *Four American Leaders, 1906*; and *The Road Towards Peace, 1915*.

## GEORGE ELIOT AND HER WORK

R. Brimley Johnson, Author of *Some Contemporary Novelists (Women)*

For further information about this writer see the articles on her books and characters, e.g. *Adam Bede*, *Mrs. Poyser*, *Middlemarch*, etc. See also *English Literature*; *Lewes*, G. H.

Mary Ann, or Marian Evans, known as George Eliot, was born at Arbury Farm, near Nuneaton, Nov. 22, 1819. The daughter of a carpenter, turned estate agent, living for us in Adam Bede and in Caleb Garth (of Middlemarch), she early became wise in all that pertains to country life in Warwickshire, of which she has given us so intimate a picture. Her mother's

and philosophy the chief staple of daily talk. Though too sensible and too affectionate to risk permanently estranging her father by any formal and visible break with the religious observances of her childhood, she turned her mind to such tasks as a translation of Strauss's *Life of Jesus*, and, in her own heart, gave up orthodox faith for ever.

When, however, in 1849, the old man died, it was only natural that she should seek further freedom of intellect in London among the men and women then chiefly inspired by the materialistic agnosticism of Herbert Spencer. She was soon afterwards appointed assistant-editor of *The Westminster Review*, where she published some weighty articles on ethics, and through which she met George Henry Lewes. The life-long union between them was not lightly entered upon. George Eliot's preoccupation with the problems of married life, her continual insistence upon the binding nature of promises between husband and wife, are pathetic testimony to her uneasiness, which never left her, in a position that could so easily be criticised from her own standard of duty. But as she had entered into it with deliberation, she never admitted disloyalty to her own conscience; and from a literary point of view, the consequences were almost an unmixed gain.

It was Lewes who first discovered, well-nigh by accident, her genius for fiction. Instantly recognizing a new force in literature, he encouraged her somewhat diffident aspirations, and himself carried out all the negotiations with editors and publishers, which resulted in the anonymous appearance of three stories in *Blackwood's Magazine*, published in 1851 as the well-known *Scenes of Clerical Life*. Being immediately popular, they were followed by *Adam Bede, 1859*; *the Mill on the Floss, 1860*; and *Silas Marner, 1861*. Henceforth she lived happily and strenuously among the thinkers of the



George Eliot

After F. D'Albert Durade

death, and the marriage of her elder sister, Christiana (also drawn in *Middlemarch*) threw on her shoulders, at 16 years old, the responsibility of her father's household. Here she was surrounded by the narrowest influences of evangelical revivalism, deeply confirmed by her aunt Elizabeth, the original of Dinah Morris (in *Adam Bede*).

A move to Coventry, in 1841, first brought her into a wider and more literary atmosphere. A student of German and Italian, Latin and Greek, and music, she now mingled with those for whom books were their most treasured companions



George Eliot. Arbury Farm, Nuneaton, where Mary Ann Evans was born, Nov. 22, 1819

day; a professional woman of letters, whose work enjoyed not only critical appreciation but an exceptional measure of popularity and influence among thoughtful middle-class readers. Her later output embraced *Romola*, 1863, a painstaking reconstruction of the past; *Felix Holt, the Radical*, 1866, a political treatise; *Middlemarch*, 1871-72, a problem novel with three loosely-knit plots; *Daniel Deronda*, 1876, a study of an alien race; besides *The Spanish Gypsy* and *The Legend of Jubal* in verse, and the somewhat ponderous collection of short essays entitled *Impressions of Theophrastus Such*. After Lewes' death in 1878, she married in 1880 John W. Cross, afterwards her biographer, but died on December 22 of the same year.

It was the grafting of a somewhat arid philosophy upon the Calvinism of early years that gave distinction and popularity to George Eliot's work. Always profoundly religious, and mastered at all times by an uncomfortably strict sense of duty, she met the questionings of the mid-Victorians with a rare and illuminating sincerity, and awoke echoes in many a young, ardent spirit newly alive to the serious mysteries of life.

She was, in fact, more receptive than original or independent; her poems, and *Theophrastus*, and in lesser degree her later novels, reveal the dangers of undigested analysis in imaginative writing; she was overmuch weighted with anxiety about the soul of mankind. But, because she was, before all things, a great artist and a warm-hearted and sympathetic woman, she was able to create an immortal gallery of human beings, whose joys and sorrows can never lose their hold on the affections. Her excellent professional training, moreover, secured fine fruit for her varied powers of ordered memory, acute observation, and dramatic instinct. The earlier novels reach right into

the heart of things because they are built on the most intimate experiences of youth, with spontaneous humour and deep emotion. If the style, the plot, and the psychology of what followed yield somewhat to affected pedantry, we have, at least in *Middlemarch*, many a revelation in emotional problems of profound interest.

Like her great feminine predecessors she was realistic and parochial; but what Charlotte Brontë first bitterly proclaimed on a few passionate topics became with her a definite philosophy universally applied. She insisted that women should dare to think for themselves, establish their own moral standards, follow their own conscience, and even demand man's acquiescence. (No writer of fiction has illustrated with greater power the ultimate ethical truths of life, the tragic pathos of continual backsliding, and the eternal significance of the choice between good and evil. Her passionate faith, indeed, called for more than reason could give to doubt. Her message was not final.)

But she left an unrivalled revelation of all that our forefathers were feeling, thinking, and striving for: a living picture, admirably studied, of Victorian domesticity, the farmer, the tradesman, and their womenkind—that great army of hitherto inarticulate, middle-class Englishmen who were to prove themselves eventually the backbone of the Empire.

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**Eliot, Sir John** (1592-1632). English statesman. Born at Port Eliot, Cornwall, and educated at Exeter College, Oxford, he was knighted in 1618, and in 1619 was appointed vice-admiral of Devon as a supporter of the duke of Buckingham. First elected M.P. in 1614, he attacked



Sir John Eliot, English statesman

From a painting in the possession of the Earl of St. Germans

Buckingham in 1626, and was a principal promoter of the Petition of Right, 1627. On March 2, 1629, Eliot read a protest against unauthorised taxation, whilst he had the Speaker forcibly held down in his chair, and two days later he was sent to the Tower. Refusing to yield to Charles I., he remained in the Tower until his death, Nov. 27, 1632. See *Life*, John Forster, 1864.

**Eliot, John** (1604-90). English missionary to the Red Indians. He was born at Widford, in Hertfordshire, and educated at Jesus College, Cambridge. In 1631 he went as a Protestant missionary to the Indians in Massachusetts. His headquarters were at Roxbury, near Boston, where he died May 20, 1690. Eliot translated the Bible into the native dialects, in addition to preparing a grammar and catechism. He assisted in the preparation of the famous Bay Psalm Book (*q.v.*). See *Life*, C. Francis, new ed. 1848 (in Jared Sparks' *Lib. of American Biog.*).

**Elis.** Country on the W. coast of Peloponnesus, Greece. Its chief city was Elis, on the Pénée, while another city, Pylos, was the seat of the kingdom of the Homeric hero Nestor. In Elis was the district of Pisa, where the great Olympic games were held every four years. It forms the modern dept. of Achaia and Elis, the capital of which is Pyrgos. See Greece.

**Elisha.** Son of Shaphat, and companion of the prophet Elijah, whose successor he became. At the translation of Elijah, he received his mantle as a sign of office. He flourished in the reigns of Jehoram, Jehu, Jehoahaz, and Joash, and had considerable influence in public affairs. His many miracles were mainly of a beneficent character.

**Elixir** (Arab. *el iksir*, the philosopher's stone). In pharmacy the term is used for preparations containing alcohol, flavouring agents, sometimes active ingredients as senna. It is a tincture of various substances held together by alcohol.

In alchemy, the *elixir of life* (*elixir vitae*) was believed to be a substance which would prolong indefinitely the life of anyone who consumed it.

**Elizabethgrad.** A town of Ukraina, in the govt. of Kherson. It stands on the Ingul river, 135 m. N. of Kherson on the Kharkov-Odessa rly. The district is fertile,

tobacco and fruit, especially melons, being much cultivated. Pop. 75,800. *Pron.* Yelizavetgrad.

**Elizabetha.** City of New Jersey, U.S.A., the co. seat of Union co. Near the mouth of the Elizabeth river on Staten Island Sound, it is 4 m. S.S.W. of Newark, and is served by the Pennsylvania and other rlys. There are large sewing-machine factories, shipbuilding yards, chemical works, foundries, oil refineries, and tanneries. Its port, 2 m. to the S.E., is on Staten Island, and ships anthracite coal and iron. Settled in 1664, it was incorporated as a town in 1796 and became a city in 1855. Pop. 88,890.

**Elizabeth.** Feminine Christian name. It originated in a Hebrew word, Elisheba, meaning God hath sworn, and became very popular throughout the Christian world.

## ELIZABETH: HER REIGN AND ITS GLORIES

A. D. Innes, Author of *England Under the Tudors*

*This biography is one of the most important of the series on the sovereigns of England and Scotland. Further information is under England: History; Mary Queen of Scots; Armada. See also biographies of Burghley; Drake; Leicester; Philip II, etc.*

Elizabeth was the daughter of Henry VIII and Anne Boleyn, whom he married before the English law courts had pronounced his earlier marriage with Catherine of Aragon invalid. Elizabeth was born on Sept. 7, 1533; Catherine did not die till 1536. According to Roman Catholics, therefore, Elizabeth was not born in wedlock. In 1536 Anne was executed, after a pronouncement of the courts that her marriage had not been valid. The title under which Elizabeth succeeded her half-sister Mary in 1558 was conveyed by the will of Henry VIII. The actual legitimate heir to the throne was her cousin Mary Queen of Scots, the granddaughter of Henry's elder sister, Margaret.

Elizabeth's girlhood was hard and loveless; she lived in an atmosphere of suspicion, in which she learnt that duplicity was the condition of self-preservation. During Mary's reign she was charged with complicity in Wyatt's rebellion, though it was found impossible to bring the accusation home to her. Throughout the reign she was kept under suspicious surveillance, but successfully evaded definite profession of her sister's religion. It was imposed upon her by her position that she should take her stand as a Protestant. Her own wisdom taught her that her strength must depend upon the solid support of her Protestant subjects.

From her accession in 1558 Elizabeth was herself the ruler of her

It has various forms, one of which is Isabella, and is common in Russia and eastern Europe as well as in the west. Eliza, Elsie, and the Scotch Elspeth are among its abbreviations.

**Elizabeth** (1207-31). Hungarian princess and saint. Daughter of Andreas II of Hungary, she was born at Presburg, and early showed her love of the ascetic life. Married in 1221 to Louis IV of Thuringia, she was driven from the court on his death in 1227. Renouncing the world, she lived at Marburg under the influence of Conrad of Marburg, and subjected herself to the severest penances and self-denial. She died there on Nov. 19, 1231, and was canonised in 1235, after many miracles reported from her tomb at Marburg. *See* Life, C. F. R. de Montalembert, Eng. trans. F. D. Hoyt, 1904.

she played with marriage proposals, the most notable of her suitors being Philip of Spain, whose offer she declined in the first months of her reign; the Austrian Archduke Charles; Henry of Anjou, afterwards Henry III of France, her junior by eleven years; and finally his younger brother, Francis. Fears were at one time entertained that she might marry her undesirable favourite, Robert Dudley, whom she made earl of Leicester. It was not till she reached the age of fifty that the theory of her probable marriage was finally abandoned.

The antagonism between Elizabeth and Philip of Spain was the controlling factor in her policy. Elizabeth saw that Philip's hands were tied; if he struck at her successfully the succession of Mary Stuart to the English throne would be the inevitable result, and Mary's association with France was so intimate that her accession would almost inevitably mean the close alliance of England and France, to the great inconvenience of Philip. Hence for five-and-twenty years a positive rupture between England and Spain seemed always imminent, but was always postponed, which was precisely what Elizabeth wanted.

### Elizabeth and Mary Stuart

England had been weakened by years of misrule, and Elizabeth did not mean to fight until England was strong enough to make sure of winning. Year after year, though she carried on and encouraged what was, in fact, a covert war against Spain, she abstained always from the last provocation which would have compelled Philip to open war. Primarily because the life of Mary Stuart was an obstacle to Philip, she kept Mary Stuart alive and a prisoner, in spite of the personal danger to herself. But Elizabeth's hand was at last forced; in 1586 she was obliged to give open official support to the United Provinces of the Netherlands and sanctioned the execution of Mary Stuart.

The result was the coming of the Spanish Armada, and its annihilation in 1588. After its destruction maritime war between England and Spain continued through the remaining ten years of Philip's life and the five years by which Elizabeth outlived him. For the old queen those years were embittered by the tragedy of the young earl of Essex, Robert Devereux, to whom she became devotedly attached, but whose arrogant folly led him into treasonable acts, from the consequences of which the queen could not save him.



*Elizabeth*

From an engraving by W. Rogers in the collection of H.M. the King



Queen Elizabeth

*From the painting by F. Zuccaro*

To the last Elizabeth persisted in her refusal to make any pronouncement as to her successor on the throne. Besides King James of Scotland, the son of Mary Stuart, there were various living descendants of the two sisters of Henry VIII, all of them Protestants, on whose behalf more or less plausible claims might be put forward. There was also a possible claimant in the person of a daughter of Philip of Spain, who claimed descent from John of Gaunt. But for Elizabeth to have nominated an heir at any time would have been an inducement to her own assassination. Only at the point of death, at Richmond, Mar. 24, 1603, was she said to have approved by a sign the name of the Scottish king.

No reign in our annals is more glorious than that of Elizabeth. Its extraordinary political success was due in great part to her own extraordinary political intelligence and to the peculiarities of her character. Between good fortune and her own ingenuity she was invariably provided with some way of escape from every complication which she herself wove, or which was woven about her. In the last resort she deliberately utilised assumed feminine weaknesses as justifying the unjustifiable in her conduct. She made full use of the shrewdest brains, the strongest hands, and the stoutest hearts that could be called into her service; and she never misjudged her servants. But ever she went her own way—devious always, not seldom false, not often generous, but never without knowing exactly what she was doing. And exactly what she was doing was what no other living man or woman, including her most intimate advisers, ever knew. She outwitted every states-

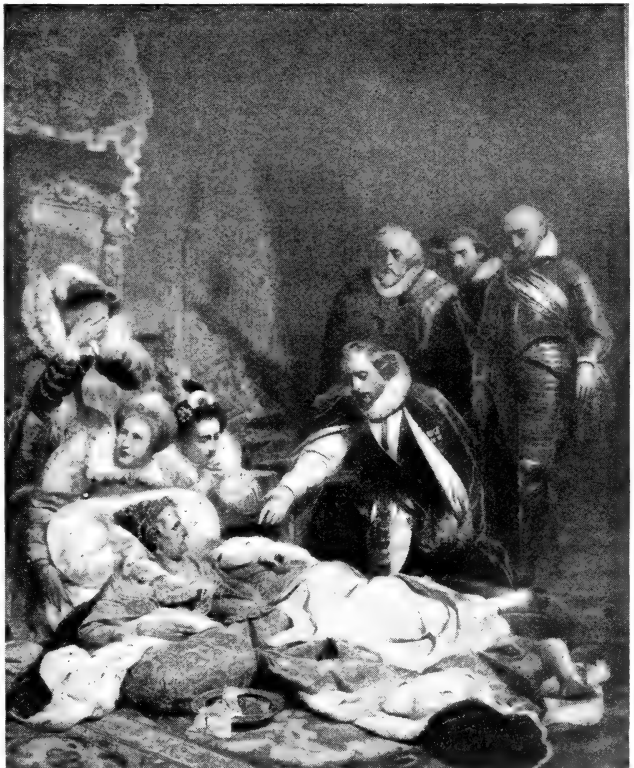
man in Europe; none outwitted her. And she raised England from the degradation into which it had fallen under her immediate predecessors to the highest rank among nations.

But it is not only Elizabeth's political success that gives to the Elizabethan era a unique place in history. It was the era in which England sprang suddenly into the position of maritime supremacy, and an era also of such poetic achievement as could be paralleled only by Athens in the past, and once again by England herself early in the 19th century.

In Elizabeth's reign the English seamen came to their own. They acquired the skill in ocean navigation which gave them a complete ascendancy over the earlier ocean sailors, Spanish and Portuguese. Frobisher and Davis explored the far northern shores of the recently discovered American continent and penetrated deep into the Arctic seas. John Hawkins and many another sea-dog of Devon made the voyage to the Spanish main,

and learnt to make little account of fighting with Spanish ships of thrice their tonnage. Save the Spaniards and Portuguese, the Englishman, John Oxenham, was the first European to lay keel in the Pacific. Francis Drake was the first captain who sailed the whole way round the world, since the Portuguese Magellan died before his voyage was completed. Before Elizabeth was dead, Cavendish, too, had sailed round the world. The Englishmen who destroyed the Armada first made it manifest that the ship of war should be herself a weapon of war, with sailors, not soldiers, to fight her; that seamanship is the grand factor in naval warfare, and is the inheritance of Englishmen more than of any other people. The Elizabethan seamen laid the foundations both of the commercial and of the naval supremacy of England, though neither was quite decisively established until nearly another century had passed.

No less astonishing was the literary development of the latter



Queen Elizabeth. The last scene in the royal palace of Sheen, Richmond, where the queen passed away, March 24, 1603, in the presence of some of her advisers

*After a painting by P. Delacroix, in the Louvre, Paris*

half of Elizabeth's reign, extending almost to the close of the reign of her successor. Before this time it would be hard to name any English writers with a real title to the epithet great, except Chaucer and perhaps Thomas More. But at last the creative literary spirit was fermenting. The drama was born. After the Armada the great poetic flood burst forth—Spenser's *Faerie Queene*, Marlowe's tragedies, and then Shakespeare; and, following upon Shakespeare, Ben Jonson and others. The foundations were laid also of an English prose literature by the Essays of Francis Bacon, Hooker's *Ecclesiastical Polity*, the vigorous narrative of Raleigh, and also by the eccentricities of Lyly and imitators, and the efforts of Sir Philip Sidney, in the search for a prose style.

Both the maritime and the literary energy were the expression of what was the fundamental characteristic of the Elizabethan period, its intense vitality, with free play for its activities. The "spacious days" are rightly named. Intellectually, as well as geographically, the horizon had been infinitely enlarged, the cramping conditions of the Middle Ages had been broken down; the new oceans and new lands were only the material type of the new intellectual and spiritual field which lay open to exploration and cultivation. See illus. p. 1113.

**Bibliography.** Lives of the Queens of England, A. Strickland, 1857; Lives of Elizabeth, E. S. Beesly, 1892; Mandell Creighton, new ed. 1899; The Courtships of Queen Elizabeth, M. A. S. Hume, rev. ed. 1904; Political History of England, A. F. Pollard, vol. vi, 1910.

**Elizabeth** (c. 1437–92). Queen of Edward IV of England. She was the daughter of Sir Richard Woodville, afterwards Earl Rivers, and was married first to Sir John Grey, who died in 1461. The young king met the handsome widow while hunting, and married her secretly in 1464, and in 1465 she was acknowledged queen and crowned. Of her children by the king her eldest son became king as Edward V, and her eldest daughter, Elizabeth, became the queen of Henry VII. She re-founded Queens' College, Cambridge, originally founded by Henry VI's consort, Margaret of Anjou. She was buried in St. George's Chapel, Windsor.



Elizabeth Woodville, Queen of Edward IV

**Elizabeth** (1465–1503). Queen of Henry VII. The daughter of Edward IV and Elizabeth Woodville, she was born at Westminster, Feb. 11, 1465. When a girl, various negotiations for a husband were carried on by her father, marriages with a Nevill and the dauphin of



Elizabeth of York, Queen of Henry VII

France, afterwards Charles VIII, being arranged. She was, however, unmarried when Edward died, in 1483, and after the murder of her two young brothers in the Tower, she, the eldest of five daughters, was his heiress. She was then in the power of Richard III, who contemplated marrying her. Before this time, the names of Elizabeth and Henry Tudor had been coupled, and the princess, then in Yorkshire, was probably in the plot that culminated in the battle of Bosworth. She and Henry were married, after Parliament had approved of the match, Jan. 18, 1486, the rival houses of York and Lancaster being thus united. She was crowned queen Nov. 25, 1487.

Elizabeth had four children; Arthur; Henry, afterwards Henry VIII; Margaret, who became the wife of James IV of Scotland; and Mary, afterwards the wife of Louis XII of France; as well as three who died in infancy. She died Feb. 11, 1503, shortly after the birth of the youngest.

**Elizabeth** (1837–98). Empress of Austria. Born Dec. 24, 1837, the daughter of Maximilian I, king of Bavaria, she married Francis Joseph of Austria, April 24, 1854. Her attempts to modify the strict etiquette of the imperial court aroused opposition amongst the nobility, but she soon gained the love of the people and retained it to the last. In 1877 she was crowned queen of Hungary. In 1889 her only son, Rudolph, died in very tragic circumstances; her cousin, Leopold of Bavaria, committed suicide, and her sister, Sophie, duchess of Alençon, was killed in a fire at a Paris charity bazaar, 1897. The empress herself was mortally stabbed by an Italian anarchist at Geneva, Sept. 10, 1898. See *Life*, A. de Burgh, *pseud.*, 1899.



Elizabeth, Empress of Austria

**Elizabeth** (1596–1662). Queen of Bohemia. The eldest daughter of James I, she was born at Falkland, Fife, Aug. 19, 1596. In 1612 she was betrothed to the elector palatine Frederick V, whom she married early in 1613, beginning wedded life at Heidelberg, the elector's capital. In 1618 Frederick was chosen king of Bohemia, and the Thirty Years' War began. He and his wife were crowned at Prague in 1619 and lived there for a time, but soon were fugitives, the queen ultimately reaching Holland, where Maurice of Orange befriended her. By this time Frederick had lost the palatinate as well as Bohemia, and the exiled pair remained in Holland, where in 1632 the elector died.



Elizabeth, Queen of Bohemia After Mierewald

Elizabeth strove to obtain the lost palatinate for her eldest surviving son, Charles Louis, and in 1648 had the satisfaction of seeing him settled at Heidelberg. He did nothing, however, to relieve the considerable poverty to which she was reduced by her husband's misfortunes and the loss of her own annuity as an English princess after the civil war broke out. She remained in Holland, befriended by the earl of Craven, to whom report, probably incorrectly, said she was married, until 1661, when she crossed over to England and was given a pension by Charles II. She was living in Leicester Square, London, when she died, Feb. 13, 1662. Elizabeth had thirteen children; two, Rupert and Maurice, fought in the Civil War for their uncle, Charles I, and the twelfth was Sophia, the mother of George I. See *Life*, M. A. E. Green, rev. ed. S. C. Lomas, 1909.

**Elizabeth** (1843–1916). Queen of Rumania. Born at Neuwed, Dec. 29, 1843, the daughter of Prince Hermann of Wied, in 1869 she married King (then Prince) Carol of Rumania. She endeared herself to her adopted country by her ministrations to the wounded in the war with Turkey (1877–78), and founded the order of Elizabeth



Elizabeth, Queen of Rumania



to reward distinguished Red Cross work. She became a widow Oct. 10, 1914, and died March 2, 1916.

A woman of cultivated tastes, a fine musician, and no mean painter, the queen wrote under the pen-name of Carmen Sylva and published poems and stories in Rumanian, German, French, and English. Her chief works are *Stürme*, 1881; *Leidens Erdengang*, 1882 (Eng. trans. by M. A. Nash as *Suffering's Journey on the Earth*, 1905); *Les Pensées d'une Reine*, 1882; *Pelesch Märchen*, 1883, a book steeped in Rumanian folk-lore.

**Elizabeth** (1709-62). Empress of Russia. Daughter of Peter the Great, and therefore called Elizabeth Petrovna,



Elizabeth,  
Empress of Russia  
From an old engraving

she was born Dec. 18, 1709. Under her cousin Anne's reign, 1730-40, she took no part in court affairs, but, living her own life, gave rein to her somewhat abandoned tastes. On Dec. 6, 1741, aided by her intimates and partisans, she dethroned the child emperor, Ivan VI, by a *coup d'état* at the Winter Palace, and mounted his throne. Throughout the Seven Years' War she worked steadfastly for Russian interests, implacable in her opposition to Frederick II of Prussia. Joining with France and Austria against Prussia in 1757, she was a tower of strength in that combination which brought Prussia almost to destruction by the end of 1761, her army having entered Berlin in 1760. To Frederick's great relief, Elizabeth died on Jan. 5, 1762. Before her accession an indolent woman, as empress she ruled with unselfish energy, strengthening Russian prestige all over Europe, and carried out various internal reforms. She founded the university of Moscow, 1755, and the Academy of Arts at St. Petersburg.

**Elizabeth** (b. 1876). Queen of the Belgians. Born July 25, 1876, at Posenhofen, she belonged to a younger branch of the family that until 1918 ruled over Bavaria. Her father was Charles Theodore, duke of Bavaria, and she was the younger of his two daughters. On Oct. 2, 1900, she was



Elizabeth, Queen  
of the Belgians

married at Munich to Albert, who, in 1909, became king of the Belgians. During the Great War the queen with her husband worked constantly for the good of her country, its soldiers and inhabitants. See Albert; Belgium.

**Elizabeth** (1635-50). English princess. The second daughter of Charles I, she was born Dec. 28,



Elizabeth,  
English princess  
From an old print

1635. She was placed in the charge of Parliament, and appealed in a touching letter to the House of Lords for permission to retain her attendants. In 1648 she helped her brother James, duke of York, to escape. She said good-bye to her father the day before his execution, and, after a visit to Penshurst, was sent in 1650 to Carisbrooke Castle, where she died, Sept. 8, 1650, from fever. She was buried in St. Thomas's Church, Newport, where is a monument to her by Baron Carlo Marochetti erected by Queen Victoria in 1856.

**Elizabeth**, PHILIPPINE MARIE HÉLÈNE (1764-94). French princess, usually known as Madame

Elizabeth. Born at Versailles. May 3, 1764, she was a granddaughter of Louis XV. Devoted to her brother Louis XVI, she accompanied him on his flight to Varennes, and shared his captivity in the Temple. Accused of aiding Louis and the royalist troops in 1792, she was guillotined,



Elizabeth,  
French princess  
From an old engraving

May 10, 1794.

**Elizabethville**. Town of the Belgian Congo and headquarters of the Katanga prov. It is 2,305 m. from Cape Town and 292 m. from Bukama, on the Lualaba portion of the Congo river. The Étoile du Congo mine is 8 m. distant, and there are other rich copper deposits in the neighbourhood. The surrounding country is well wooded and there are numerous agricultural settlements. Pop. (European), 929.

**Elizabetpol**. Govt. of Transcaucasia. It is bounded N. by the govts. of Daghestan and Tiflis, E. by Baku, W. by Erivan, and S. by the Persian prov. of Azerbeijan. A mountainous steppe region, with extensive forests, it is traversed by the river Kur. The inhabitants are

chiefly occupied in cattle rearing, agriculture, cultivation of vines, and silkworm breeding. Other industries are copper mining, silk spinning and weaving. The area is 16,991 sq. m. Pop. 1,117,200, mostly Armenians and Tartars.

**Elizabetpol**. Town of Transcaucasia. Chief town of the govt. of Elizabetpol, it is 90 m. S.E. of Tiflis, on the Gauja and the Tiflis-Baku Rly. There are many Armenian churches in the town. The inhabitants are chiefly engaged in the cultivation of fruit, vegetables, and tobacco, and in silkworm rearing. Elizabetpol, formerly the residence of a Moslem khan, was taken by the Russians in 1804. Some ruins in the neighbourhood have yielded coins of many nations. Pop. 63,400.

**Elk** (*Alces machlis*; Gr. *alkē*, Lat. *alcēs*). Largest member of the deer family, known in America as the moose. The European elk is found in Scandinavia, E. Prussia, Poland, and parts of Russia; but is now much diminished in numbers, and



Elk. Specimen of the common elk, or moose, *Alces machlis*

only occurs very locally. The adult elk is usually about 6½ ft. high at the withers, and may weigh as much as 1,000 lb. It is very long in the leg, of heavy build, short in the neck, with long ears, and has a very long head with overhanging muzzle. The antlers of the male are very broad and palmated. It inhabits dense forests, where it feeds mainly on the leaves and young branches of the willow and birch as well as on lichens and moss. The flesh is apt to be coarse, and has a musky flavour. See Moose.

**Elk**. Group of mountains of Colorado, U.S.A., in Pitkin co. They form a section of the Rockies near Aspen, and the highest summit is Castle Peak, with an elevation of 14,259 ft.

**El-Kab**. Site of the ancient city Nekheb, near the right Nile bank, 44 m. above Luxor, Upper Egypt. The predynastic capital of the S., it was sacred to the vulture-goddess Nekhet. Within the girdle-wall, 37 ft. thick and enclosing 75 acres, Quibell conducted excavations in 1897. In the vicinity

are many rock-cut tombs with agricultural and domestic scenes. The royal residence lay across the stream at Hieraconpolis.

**El Kantara.** Town of Egypt, situated on the Suez Canal. Here on Jan. 26, 1915, in their first invasion of Egypt, an advance guard of Turks came into touch with a British patrol. On Feb. 3 they launched subsidiary attacks against the canal at El Kantara and other points to cover their main attack at Serapeum, 32 m. further S. This battle for the canal ended in the complete defeat of the Turks. A British war memorial is to be erected here. See Egypt; Palestine, Conquest of.

**El Kefr.** Village of Palestine. It lies in the foothills of Mt. Ephraim, 18 m. E. by N. of Joppa, and 16 m. S.W. of Shechem. It was captured together with Refat by the British on April 9, 1918. See Palestine, Conquest of.

**Elkesaites** OR ELCHASAITES. Heretical 3rd century sect which followed alleged revelations contained in the Book of Elchasai. This taught that the Son of God had been manifested in the persons of many good men, and that Christ was merely one of these manifestations.

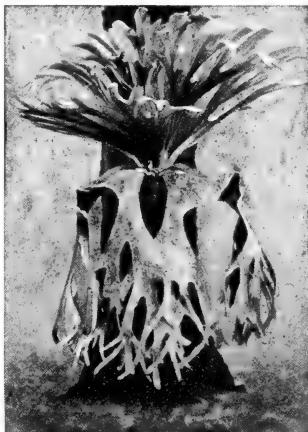
**Elkhart.** City of Indiana, U.S.A., in Elkhart co. At the junction of the Elkhart and St. Joseph rivers, 100 m. E.S.E. of Chicago, it is served by the Lake Shore and Michigan S. and other rlys. Settled about 1833, it received its city charter in 1875. Pop. 21,735.

**Elkhorn.** River of Nebraska, U.S.A. Rising in the N. part of the state, it flows 200 m. S.E. to La Platte river, an affluent of the Missouri.

**Elkington, GEORGE RICHARDS** (1801-65). British manufacturer. Born Oct. 17, 1801, at Birmingham, the son of a spectacle-maker, he became partner and afterwards sole proprietor of his uncle's silver-plating business in that city. By energy and experiment he made electro-plating a commercial proposition, and superseded the old-fashioned method of plating by soldering thin sheets of silver upon copper. He died Sept. 22, 1865.

**El Kosseir.** Seaport of Upper Egypt. It stands on the Red Sea, 96 m. E. of Kenah, and has a good harbour. Pop. 2,000.

**Elk's-horn Fern** (*Platycerium*). A small genus of large epiphytall ferns. They are natives of Australia, Malaya, and Africa. The lower fronds, which are barren, are thick and undivided, and spread close to the tree-trunk on which they grow. The much longer fertile fronds present the appearance of a



Elk's-horn Fern. Specimen of *Platycerium grande*, growing on a tree trunk

stag's antlers. In an Indian species (*P. biforme*) they are from 6 ft. to 15 ft. in length.

**El Kutrani.** Village of Hejaz. It is on the Hejaz Rly., 80 m. N. of Maan on the borders of Moab, and was finally captured in the great Allied offensive in the autumn of 1918. See Hejaz; Palestine, Conquest of.

**Ell** (Lat. *ulna*, Ger. *ellenbogen*, Eng. *elbow*). Medieval European measure of length. It varies from the English ell, probably borrowed from France, which equals 45 ins., to the Scottish of 37 ins. and the Flemish of 27 ins.

**Ellagic Acid** OR BEZOARDIC ACID ( $C_{14}H_6O_8$ ). Constituent of the animal concretions which are met with in Oriental countries under the name of bezoars. It can also be made artificially by treating gallic acid in acetic acid solution with potassium persulphate and sulphuric acid. The name is Fr. *galle* (gall) reversed, with suffix—ic.

**Elland.** Town and urban district of Yorkshire (W.R.). It stands on the Calder, 3 m. S.E. of Halifax, and has a station on the L. & Y. Rly. The industries include the manufacture of textiles, while there are stone quarries in the neighbourhood. The chief of several public buildings is S. Mary's Church. Pop. 10,676.

**Ellenborough, EDWARD LAW, BARON** (1750-1818). British lawyer. Born at Great Salkeld, Cumberland, Nov. 16, 1750, he was educated at Charterhouse and Peterhouse, Cambridge. He was called to the bar in 1780 and eight years later was leading counsel for Warren Hastings (q.v.). In 1802 he was appointed lord chief justice and created a peer. He resigned office in Nov., 1818, and died Dec. 13, 1818.



*Ellenborough*  
After Sir Thos. Lawrence

**Ellenborough, EDWARD LAW, EARL OF** (1790-1871). British administrator. Born Sept. 8, 1790,



1st Earl of Ellenborough,  
British administrator

the eldest son of the first Baron Ellenborough, he was educated at Eton and S. John's College, Cambridge, and in 1813 entered Parliament. Made lord privy seal in 1828, he was transferred the same year to the presidency of the board of control, and in 1841 became governor-general of India. He annexed Sind in 1842 and subdued Gwalior in 1844. He was made first lord of the Admiralty in 1846, and president of the board of control in 1858. He died Dec. 22, 1871.

**Ellen's Isle** OR EILEAN MOLACH. Islet in Loch Katrine, Perthshire, Scotland. It is largely the scene of Scott's *Lady of the Lake*.

**Ellerman Lines.** British steamship company. An offshoot of the Bibby line founded in 1840, it was



Ellen's Isle, the woody islet on Loch Katrine immortalised in Scott's poem, *The Lady of the Lake*

purchased in 1870 by Frederick Leyland & Co., and flourished as the Leyland line until 1902, when it was sold, the Atlantic services being acquired by the International Mercantile Marine, an American combine, and the Mediterranean services by Sir J. R. Ellerman. The latter, born 1862, was created C.H. in 1921, and was interested in newspaper enterprises, including *The Times*.

The Ellerman lines control the City, Ellerman, Hall, Bucknall, Papayanni, Westcott and Laurance, and Wilson lines. The City and Hall lines run fast passenger steamers from Liverpool to India and Egypt; the Ellerman and Bucknall lines have a big fleet going to almost all parts of the world—Africa, Australia, New Zealand, India, Mesopotamia, the Far East, and New York; the Westcott and Laurance line serves the Mediterranean, the Black Sea, and the Danube. The headquarters of the combination are 12, Moorgate Street, London, E.C.

**Elles, HUGH JAMESON (b. 1880).** British soldier. Born April 27, 1880, he was gazetted to the R.E.



Hugh J. Elles,  
British soldier

Russell

in 1899 and served in the South African War 1901-2. He passed the Staff College course, 1913-14. Crossing with the Expeditionary Force in the latter year, he served in France throughout the Great War, becoming major, 1915, brevet-lieut.-colonel, 1918, and colonel, 1919. He was promoted temporary major-general commanding the Tank Corps in 1918.

**Ellesmere.** Urban dist. and market town of Shropshire, England. It is 11 m. S.W. of Whitchurch, on the Cambrian Rly., and on the mere and canal of the same name. No traces remain of its castle, whose site is now occupied by a recreation ground; S. Mary's Church is a fine Gothic structure. Malting and tanning are industries. Market day, Tues. Pop. 1,946.

**Ellesmere.** Large island of British N. America. In the Arctic region, N. of Devon Island, it is separated from Greenland by Smith Sound, Kennedy Channel, and Robeson Channel. It is deeply indented, especially on the W. coast, and has the Prince of Wales mountains on the E. It is a desolate tract covered with ice and snow.

**Ellesmere, EARL OF.** British title borne since 1846 by the family of Egerton. Francis Leveson-

Gower, a younger son of the 1st duke of Sutherland, assumed the name of Egerton in 1833, when he inherited the estates of the Egertons, dukes of Bridgewater. He was a politician with remarkably enlightened views, and won some distinction as a writer and a patron of the arts. He was created earl of Ellesmere in 1846, and died Feb. 18, 1857, and from him the present earl is descended. The earl's chief seat is Worsley Hall, Manchester, but he has property in Shropshire, where is Ellesmere. His eldest son is called Viscount Brackley.

#### Ellesmere and Chester Canal.

Waterway of England and Wales connecting the Dee and Mersey. It connects Chester with Ellesmere port, on the Manchester Ship Canal line.

#### Ellesmere Port and Whithy.

Urb. dist. of Cheshire, England. It is 7 m. N. of Chester, at the junction of the Manchester Ship and Ellesmere Canals. An embankment about 1 m. long separates the Mersey from the Manchester Ship Canal. There are large docks, warehouses, and dyeworks, and synthetic indigo is manufactured in large quantities. Pop. 10,366.

**Ellice Islands.** Group of coral islands in the Pacific Ocean. Called the Lagoon islands, they lie N. of Fiji, between lat. 5° 30' and 11° S. and long. 176° and 179° 50' E. The chief industries are connected with phosphates and copra. They were formally annexed by Great Britain in 1916 as the Gilbert and Ellice Islands Colony, and are under the jurisdiction of the high commissioner for the W. Pacific.

**Ellichpur.** Town of India, chief town of Berar prov. It is 100 m. W. of Nagpur. Once an important city, its prosperity has declined. By local tradition it is supposed to date from the 11th century; it is known to have been prominent in the 13th century, and then passed under Mahomedan rulers. Besides an old palace, the town contains a number of early remains, including a burial shrine associated with a mythical hero, Shah Abdur-Rahman. Cotton is the chief industry. Pop. 13,909, three-fifths Hindus, one-third Mahomedans.

**Elliot, JANE OR JEAN (1727-1805).** Scottish song writer. The daughter of Sir Gilbert Elliot, 2nd bart., of Minto, she is famous as the author of *The Flowers of the Forest*, which Sir Walter Scott included in his *Minstrelsy of the Scottish Border*, 1802. She died in Edinburgh, March 29, 1805.

**Elliot, JOHN (d. 1808).** British sailor. Son of Sir Gilbert Elliot, a Scottish judge, he entered the navy and in 1758 served under Hawke and Anson. He distinguished him-

self in 1760 off the coast of Ireland in the capture of three French vessels. After serving in the Mediterranean and at Plymouth he commanded the Trident to America. In 1779 he sailed under Rodney to the relief of Gibraltar, distinguished himself at St. Vincent, and fought under Kempenfelt. From 1786-89 he was commander-in-chief at Newfoundland, and was promoted admiral, 1795, when he retired. He died Sept. 20, 1808.

**Elliott, CHARLOTTE (1789-1871).** English hymn-writer. She was born at Clapham, March 18, 1789, and after an uneventful life, passed for the most part as an invalid, she died at Brighton, Sept. 22, 1871. Her hymns, amounting to about a hundred and fifty, made her among the foremost of British women hymn-writers. Many of them became very popular, notably "Just as I am, without one plea."

**Elliott, EBENEZER (1781-1849).** British poet, known as the Corn Law Rhymers. Born at Mas-



Ebenezer Elliott,  
British poet

From a contemporary sketch

borough, Yorkshire, March 17, 1781, he was engaged, like his father, in the iron trade. He attributed his father's ruin and his own early losses to the bread tax, and in his *Corn Law Rhymes (1831)* he depicted in vigorous language and with intense feeling the sufferings of the poor under the Corn Laws. His hymn beginning "When wilt Thou save the People?" is still sung. He died at Great Houghton, Dec. 1, 1849. See *Life*, John Watkins, 1850; *Poetical Works*, ed. Edwin Elliott, 1876.

**Elliott, GRACE DALRYMPLE (c. 1758-1823).** Reputed mistress of George IV. She was a daughter of



Grace Dalrymple  
Elliott,  
British adventuress

After Cosway

Hew Dalrymple, an Edinburgh lawyer, was educated in France, in 1771 married John Elliott, and was divorced in 1774. About 1782 she gave birth to a daughter, of whom the prince of Wales acknowledged himself the father. She subsequently settled in France, and died near Sèvres, May 16, 1823. Her account of her life during the French Revolution was published in 1859.

**Elliott, MAXINE** (b. 1873). American actress. Born in Rockland, Maine, Feb. 5, 1873, she began acting in The Middleman, with E. S. Willard (New York, Nov. 10, 1890), and was soon taking leading parts, including that of Mrs. Allenby in *A Woman of No Importance*. Her Shakespearean renderings were greatly praised. Her first appearance in London was as Silvia in *The Two Gentlemen of Verona*, Daly's, July 2, 1895; from then onwards she acted in England frequently, a notable success being *Zuleika* in *Joseph and His Brethren* (His Majesty's, 1913). Her sister, Gertrude, also an actress, is the wife of Sir J. Forbes-Robertson (q.v.).



Maxine Elliott,  
American actress  
\*L. Cassell Smith

**Ellipse** (Gr. *elleipsis*). A curve such that the sum of the distances of any point on it, from two fixed points within it, is constant. When the fixed points coincide the curve becomes a circle. See Conic Sections.

**Ellipsis**. Figure of speech, whereby part of a sentence, strictly necessary for complete fullness of expression, but which can easily be supplied from the grammatical connexion, is omitted. It is often deliberately employed in writing, in order to lay stress upon what is more important and essential, unessentials being omitted.

**Ellipsoid**. Solid of which all sections are either ellipses or circles. See Geometry.

**Ellis, ROBINSON** (1834-1913). British classical scholar. He was born at Barming, in Kent, Sept. 5, 1834, and educated at Rugby and Balliol College, Oxford, where his career was most distinguished. In 1883 he became reader in Latin at the university, and in 1893 professor of Latin. He is chiefly known for his work on Catullus, whose poems he edited and also translated in the original metres; while his *Commentary on Catullus* (1876, 2nd ed. 1889) ranks as the highest authority on its subject. He died at Oxford, Oct. 9, 1913.

**Elliston, ROBERT WILLIAM** (1774-1831). British actor and theatrical manager. Born in London, April 7, 1774, the son of a watchmaker, and educated at S. Paul's School, he made his first appearance at Bath, as Tresselt in *Richard III.* On Aug. 29, 1796, he played Sir Edward Mortimer in a revival of George Colman's *The Iron Chest* at The Haymarket, where he acted during the summer seasons of 1803-5 and 1811. He made his debut at Drury Lane, Sept. 20, 1804, succeeding Kemble as Rolla in *Pizarro*, continued a member of the company till 1809, rejoined it from 1812-15, and was lessee of the theatre from 1819-26, when he retired, bankrupt. He afterwards became lessee of the Surrey Theatre, where he played until within a fortnight of his death in 1831. Both as a tragedian and a comedian Elliston stands high in the annals of the British stage. See *Life and Enterprises* of R. W. Elliston, George Raymond, 1857.

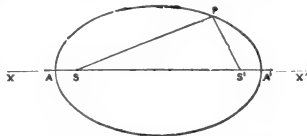


Robert W. Elliston,  
British actor  
After Harlowe

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**Ellora**. Ruined town of India, in Hyderabad state. Situated 13 m.



Ellipse.  $SS'$  are foci on the axis  $XX'$ .  $AA'$  is called the principal diameter.  $P$  is any point on the ellipse, and has the property that  $SP + S'P$  is constant

N.W. of Aurangabad, it is famous for the Kailas temple built in the 8th century, and for its rock temples and caves dating from the 5th to the 9th or 10th century. These caves cover the face of a hill for 1½ m. and belong to three groups—Buddhist, 12 caves, Brahminical, 17, and Jain, 5. See illus. p. 1799.

**Ellore**. Town of Madras, India, in the Kistna dist. It stands near Colair Lake, 38 m. N. of Masulipatam. Ellore is noted for its carpets, and has a large trade in grain. Pop. 37,819, nearly all Hindus.

**Ellsworth**. City of Maine, U.S.A., the co. seat of Hancock co. A port of entry on Union river, at the head of navigation, it is 30 m. S.E. of Bangor on the Maine Central Rly. It has several prominent buildings. There are foundries and an important fish hatchery. Settled in 1763, it was incorporated in 1800 and granted a city charter in 1869. Pop. 3,549.

**Ellwood, THOMAS** (1639-1714). English author and Quaker. He was born at Crowell, Oxfordshire, and became a Quaker in 1659, a conversion which cost him several terms of imprisonment. He became companion and reader to Milton after the latter lost his sight, and suggested to him the idea of *Paradise Regained*. He assisted George

Fox in the dissemination of his principles, and wrote various polemical treatises, but his most important work is his autobiography, which was finished by Joseph Wyeth and published in 1714; new ed. by Crump, 1900. He died March 1, 1714.

**Elm** (*Ulmus*). Familiar native tree of Britain, of the natural order Urticaceae. More frequently found in avenues, parks, and hedges than in woods and forests, elms flourish in any soil, but to attain to their full height of 80 ft. or thereabouts, and to make the best wood, re-



Elm tree in full foliage. Above, leaves and flowers of the common elm

Photo, F. R. Hinkins

quire a rich alluvial loam. The most familiar species are wych elm (*U. montana*) and the bell elm (*U. campestris*). Both may be planted in open weather at any time between autumn and spring. The usual way of increasing in private gardens is by layering, or in the case of the bell elm by removal of suckers, as this tree seeds scantily.

Elms should not be planted near dwelling-houses, as the timber has a tendency to decay inwardly, involving danger of the limbs dropping off suddenly, without any warning, especially in high winds.

**Elmalu, ELMALI, OR AIMALI**. Town of Asia Minor, in the vilayet of Konia. Situated on the river Myra, 25 m. from its entrance into the Mediterranean, it is about 60 m. S.W. of Analia. Pop. 4,000. The word means apple town.

**Elman, MISCHA** (b. 1891). Russian violinist. Born at Talnoï, Russia, Jan. 20, 1891, he received



Mischa Elman,  
Russian violinist

his musical education at Odessa and St. Petersburg. He made his debut there in 1904, afterwards appearing in Berlin, Dresden, and elsewhere. His first appearance in London took place March 21, 1905; in New York in 1908. From the first he was recognized as one of the world's greatest violinists.

**Elmet.** Name of a little British kingdom in Yorkshire. It existed in the 6th century and earlier, but was ended when conquered by Edwin, king of Northumbria, about 617. Its extent, roughly, corresponded to the West Riding. The name was long preserved by the forest of Elmet.

**Elmina** OR ST. GEORGE DEL MINA. Small port of the Gold Coast colony, 8 m. S.W. of Cape Coast Castle. Here is a castle, built by the Portuguese in 1482 and succeeding years, taken by the Dutch in 1637, and transferred to the British in 1872, with the other Dutch settlements in West Africa. Pop. 5,091.

**Elmira.** City of New York, U.S.A., the co. seat of Chemung co. On the Chemung river, 145 m. S.E. of Buffalo, it is served by the Erie and other rlys. It contains the state reformatory, a federal building, a state armoury, and other public buildings, and among several educational institutions are Elmira College for women, a free academy, and a school of commerce. A busy rly. and industrial centre, it has rly. workshops, iron works, foundries, and glass, tobacco, and boot and shoe factories. Settled in 1788, it was incorporated in 1828 and received a city charter in 1864. Pop. 38,275.

**Elmore Process.** Method of making seamless copper (or other metal) tubes by depositing the metal by electrolytic action on a bar or mandrel kept rotating in the electric bath. It was devised by J. O. S. Elmore, an engineer in India, in 1896. A tube so formed would be wanting in mechanical strength if the deposition only were depended upon. Elmore therefore compacted the tube as the deposition of metal proceeded by rotating the mandrel against an agate burnisher, and thus greatly increased its strength. The advantage of the process lies in the

purity of the product and the elimination of smelting processes. *See* Copper; Electrolysis.

**Elmsborn.** Town of Slesvig-Holstein, Germany. It stands on the Krüchau, about 10 m. from its junction with the Elbe and 23 m. from Hamburg. It is a river port, and has a shipping trade. Other industries including the manufacture of textiles, beer, and boots; also shipbuilding. Pop. 14,790.

**Elmsley, PETER** (1773-1825). British scholar. Educated at Westminster School and Christ Church, Oxford, he showed a remarkable aptitude for study. He was ordained, but devoted most of his time to the study of the classics and won a reputation throughout Europe by his critical work on the Greek tragedians. He wrote for *The Edinburgh Review* and *The Quarterly Review*. In 1823 he became principal of St. Alban Hall and Camden professor of ancient history at Oxford. He died March 8, 1825. *See* History of Classical Scholarship, vol. iii, J. E. Sandys, 1908.

**Elmslie, WILLIAM GRAY** (1848-89). British divine. Born at Inch, Aberdeenshire, Oct. 5, 1848, he was educated at Aberdeen University and New College, Edinburgh, and later studied in Germany. In 1873 he became assistant to Dr. J. Oswald Dykes, at Regent's Square Presbyterian Church, London, and was chosen minister of Willesden Presbyterian Church in 1875. In 1880 he was appointed tutor of Hebrew in the Presbyterian College, London, being elected to the professorship of Hebrew and O.T. literature in 1883. He died in London, Nov. 16, 1889. His son, William Alexander Leslie (b. 1885), a distinguished Oriental scholar, wrote *Aboda Zara* or *The Mishna on Idolatry*, 1911, and *Studies in Life from Jewish Proverbs*, 1917. *See* W. G. Elmslie, *Memoir and Sermons*, ed. W. R. Nicoll and A. N. Macnicoll, 3rd ed. 1890.

**El Mughar, BATTLE OF.** Fought between the British and the Turks, Nov. 13-14, 1917, and also called the battle of Katrah. After capturing Gaza, Gen. Allenby pushed N. without delay, and on Nov. 8, 1917, struck hard at the Turks from both Gaza and Sheria, Scots and Indian troops advancing along the coast to Deir Sineid, from which the Turks had a rly. to Huj, and Londoners, assisted by yeomanry, taking Huj and Jemmameh.

Allenby's objective was the junction station where, from the Central Palestine rly., a branch line ran E. to Jerusalem, possession of which meant depriving the Turkish forces

in the Holy City of supplies by rail from the N. and the separation of these forces from those on the coast. With the 52nd (Scots) division, Indian, and other troops on his left, next the sea, Londoners and yeomanry in the centre, and Anzacs and other cavalry on his right, Allenby swept forward, occupying Ascalon, Ashdod (Esud), and Tel es Safi (Gath), and on Nov. 13 began a general assault of the position that the retreating Turks had taken up from El Kubeibeh on the N.W., through El Mughar, to Beit Jibrin on the S.E.

Most of the country was open and rolling, dotted with small villages, two of which, Katrah and El Mughar, stood on a ridge which the Turks had fortified, and was the centre of the fighting. The Scots and yeomen got on the ridge, but twice were repulsed. Charging a third time, and assisted by W. of England infantry and other yeomanry, they took both villages, capturing 1,100 prisoners. After losing El Mughar the Turks abandoned the junction station, and the British occupied it on Nov. 14. *See* Palestine, Conquest of.

**El Mugheir.** Village of Palestine. It lies slightly W. of the Jordan, 17 m. N. of Jericho. British and Indian troops occupied it Sept. 19, 1918. *See* Palestine, Conquest of.

**El Obeid.** Town of the Anglo-Egyptian Sudan, capital of the prov. of Kordofan. It is the terminus of the Kordofan extension of the Sudan government rlys. (completed 1911), and is situated about 160 m. by road W. of the Nile and 430 m. by rly. S.W. of Khartum. A primary school where English is taught has been opened here. The pop. fluctuates, but the normal figure is about 12,000.

**Elobey.** Two small islands, called Great and Little, off the mouth of the Gabun river, W. coast of Africa, belonging to Spain. Great Elobey is covered with bush, and has an area of  $\frac{1}{2}$  sq. m. The area of Little Elobey is 36 acres. The islands are under the control of a sub-governor, who is responsible to the governor-general resident at Santa Isabel on the island of Fernando Po. Pop., Gt. Elobey, 123; Little Elobey, 222, mostly of the Benga tribe.

**Elocution** (Lat. *eloqui*, to speak out). The art of effective public speaking. In classical times it included oratory, but now refers solely to the method and manner of delivery, the right study of which includes breath control, voice production, articulation, pronunciation, and expression.

Breath is the motive power of



the voice. Authorities agree that the intercostal diaphragmatic method of breathing, *i.e.* the free expansion laterally of the lungs at their base with the descent of the diaphragm in inspiration and the reverse action with an even abdominal pressure in expiration—inhalation quickly and silently and exhaling slowly and evenly—gives a maximum of breath with a minimum of exertion. There should always be a supply of breath in the lungs, and inspiration should be renewed well before expiration is accomplished. A speaker's words should be poised on the breath, for any escape through or between the words will cause loss of tone and power, and, under continuous strain of public work, may lead to permanent injury of the voice. An open throat, a mobile jaw, muscular control of the tongue and soft palate, together with right control of the breath, are the keystones of correct voice production.

A knowledge of present-day accepted pronunciation is essential; provincialisms must be overcome. A sense of rhythm and beauty of diction, with a distinctive delivery, is as essential in the speaking of modern, as in that of classical, selections. Enunciation is the medium for expressive pronunciation, clearness of articulation being of the greatest importance. The tongue, hard and soft palate, gums, teeth, and lips all constitute part of the articulating organs, and by their partial or complete contact the consonants are formed. Vowels, being purely vocal, are produced by the changing shape of the mouth cavity and varying positions of the tongue. Pace must be varied according to the different emotions expressed. Emphasis is used principally to mark the salient word or words of a sentence, so as clearly to define the meaning. Its too frequent use negatives its own value, and over-emphasis is an offence to the intelligence. Pauses facilitate proper phrasing, and at the same time permit the reciter to take breath; the rhetorical pause, in which the breath is suspended, is used to emphasise some special effect. Tone should illumine and colour the words so that the full beauty of the theme is appreciated by the hearers. Lack of variety in tone renders many a speaker dull and spiritless.

Gesture should directly help the meaning of a passage. It should never be redundant, and, when used, should be spontaneous and easy, the arms moving from the shoulders, not from the elbow, the hands conveying the expression and completing the significance

of the gesture. The body should be well poised and the position firm, the weight being shifted easily from one foot to the other so that there is a free and full command of all movements. Facial expression, the complement of voice and gesture, indicates the changing thoughts or feelings as they pass through the speaker's mind, the eyes visualising the intensity of the emotion and marking more than all else the personality of the speaker.

The prevalent method of speaking is careless and slovenly. This inefficiency is due largely to the indifference with which this important subject is treated in our present educational scheme. Elocution should be compulsory in all schools, and it should apply to all classes alike. It should be taught from childhood, when the imitative faculty is more active.

#### Acton Bond

*Bibliography.* A Grammar of Elocution, J. Millard, 2nd ed. 1882; The Art of Speaking, Ernest Perwee, 3rd ed. 1904; Voice Production in Singing and Speaking, Wesley Mills, 5th ed. 1920.

**Elohist.** Term used in Biblical Criticism to denote the writer of one of the documents used in the compilation of the Pentateuch, or rather the Hexateuch. This is called the Elohist document because the writer uses consistently the name *Elohim* for the God of the Hebrews, whereas the writer of another document (the Jehovistic) employs with equal consistency the divine name *Jehovah*. See Criticism; Hexateuch.

**Elopement.** Name given to the secret flight of a pair of lovers, generally with the object of marriage. Unless abduction can be proved it is not an offence against the law. See Abduction.

**El Paso.** City of Texas, U.S.A., the county seat of El Paso co. A favourite health resort and a port of entry, it stands 3,760 ft. above sea level on the Rio Grande, which separates the state from Mexico. Situated opposite Ciudad Juarez, it is the terminus of the National of Mexico and several other rlys. Among its buildings are the federal building, the city hall, a Carnegie library, and a sanatorium. It contains also military and civil educational institutions and a large number of parks. It trades largely in lead, copper, and silver, and has foundries, rly. repair shops, flour mills, and cigar and wood box factories. El Paso received its city charter in 1873. Pop. 69,150.

**Elphinstone.** MOUNTSTUART (1779–1859). British administrator. Born Oct. 6, 1779, the fourth

son of the 11th Baron Elphinstone, he entered the Bengal civil service in 1796. Appointed resident at Nagpur in 1804, he was sent as envoy to Kabul in 1808, and was resident at Poona from 1811–17, and commissioner after its annexation. From 1819–27 he was governor of Bombay. He returned to England in 1829 and lived in retirement, twice refusing the governor-generalship of India. He compiled the famous legal code known by his name, and virtually founded the system of state education in India. Elphinstone College, in Bombay City, was endowed by the natives as a memorial of his administration. He wrote a valuable Account of the Kingdom of Cabul and its Dependencies, 1815; and a History of India (Hindu and Mahomedan periods), 1841. He died Nov. 20, 1859. See Life, J. S. Cotton, 1892.



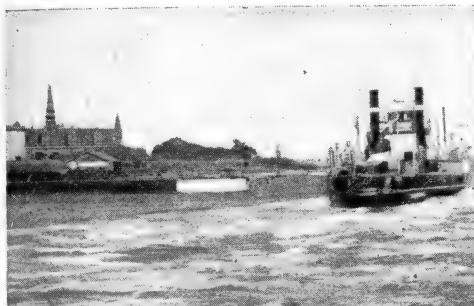
Mountstuart Elphinstone, British administrator  
From a portrait in the British Museum

**Elphinstone, WILLIAM** (1431–1514). Scottish prelate, founder of Aberdeen University. He was educated at Glasgow University, of which he became rector in 1474, was made bishop of Ross in 1481, and nominated to the see of Aberdeen in 1483. In 1488 he was appointed lord chancellor, and lord privy seal in 1492. In 1494 he established King's College, the original foundation of Aberdeen University, appointing Boece (*q.v.*) its first rector, and securing grants from James IV for its maintenance. He introduced the printing press into Scotland, 1507. He died at Edinburgh, Oct. 25, 1514, it is said through grief at the battle of Flodden. See illus. p. 17.

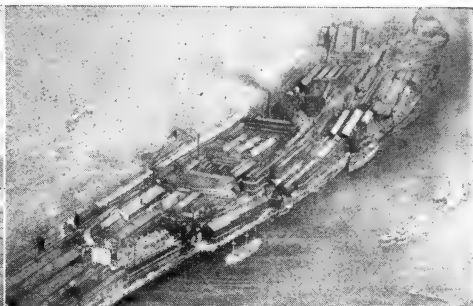
**Elsass-Lothringen.** German name for the district better known as Alsace-Lorraine (*q.v.*).

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**Elsie Venner.** Novel by Oliver Wendell Holmes. After serial appearance in The Atlantic Monthly under the title of The Professor's Story, the novel was published in volume form in 1861 as Elsie Venner: a Romance of Destiny. Its theme is the possible effect of antenatal influence upon individual conduct. In this case a mother is bitten by a rattlesnake shortly before giving birth to her child. The romance shows Elsie Venner's whole life and character affected by that pre-natal poisoning, since her nature turns out to be half that of a snake.



Elsinore, Denmark. View of the Narrows at the entrance to The Sound, with the ferry which crosses to Helsingborg on the Swedish coast



Elswick. The works and shipyard on the north bank of the Tyne. The Armstrong-Whitworth works cover an area of 72 acres, and have a river frontage of 8,100 ft. By courtesy of Sir W. G. Armstrong, Whitworth & Co.

**Elsinore** (Dan. *Helsingør*). Seaport in Denmark. In the dist. of Frederiksborg and on the island of Zealand, it stands on The Sound, and has ferry communication with Helsingborg on the Swedish coast, and connexion by rly. with Copenhagen. Shipbuilding is the principal occupation, and iron-founding, engineering, and agriculture are carried on. The place is referred to in Shakespeare's *Hamlet*. Pop. 13,783.

**Elster.** Name of two rivers of Germany, the Schwarze (black) and Weisse (white). The former rises in the mountains between Saxony and Bohemia and flows mainly N. until it falls into the Elbe 10 m. from Wittenberg. Its length is 110 m. The white Elster rises near Eger in the Elstergebirge in Bohemia, but most of its course is in Saxony. It falls into the Saale in two branches, one near Halle and the other near Merseburg. It flows past Plauen and Leitz, and past Leipzig, where the Pleisse joins it. Its length is 120 m. The town and watering-place of Elster stands on the white Elster near the Bohemian border. The Elstergebirge is a range of mountains in Bohemia. It runs from the Erzgebirge to the Fichtelgebirge, and reaches a height of 2,630 ft.

**Elstow** (formerly Helenstow). Parish and village of Bedfordshire, England. It is 1 m. S. of Bedford and is noted as the birthplace of John Bunyan (*q.v.*). Pop. 499.

**Elstree.** Parish and village of Hertfordshire, England. It is a station on the M.R., 7 m. S. of St. Albans. The church of S. Nicolas was rebuilt in the 19th century. Here are paper mills and a large reservoir used for fishing and boating. Pop. 1,939.

**Elswick.** Parish of Northumberland, England, forming a ward in the W. of the co. bor. of Newcastle, with station on the N.E.R. Here are situated the extensive Elswick Works of Sir W. G. Armstrong, Whitworth & Co., Ltd. During

the Great War vast quantities of munitions of war were manufactured here. Elswick Park was opened as a public recreation ground in 1878. Pop. 58,352. See Armstrong, Whitworth & Co.

**El Teb, BATTLE OF.** Fought by the British, Feb. 29, 1884, against the Arabs. El Teb is a post in the Anglo-Egyptian Sudan, on the road from Trinkitat on the Red Sea to Tokar. In 1883 Osman Digna was besieging Tokar, and Valentine Baker, with a force of 4,000 men, was sent to relieve it. On Feb. 4, 1884, he was met by the tribesmen and was routed, two-thirds of his men being killed. Tokar then surrendered.

A British force of 4,400 men was then collected from Egypt and India, and under Sir G. Graham was landed at Suakin. On Feb. 29 this force faced the Arabs in their camp at El Teb. The latter threw themselves in wild fury against the British square, but after a fierce combat they were decisively beaten. The British casualties were 34 killed and 155 wounded, largely incurred in a charge made by the 10th and 19th Hussars.

**Eltham.** Parish of Kent, in the met. bor. of Woolwich, 7 m. S.E. of London Bridge. Once a marketing town, it contained a palace, the fine banqueting hall of which still remains. Well

Hall, an Elizabethan mansion, is supposed to have been occupied by Sir Thomas More's daughter. Eltham has many open spaces, including Eltham Common, Eltham Green, Eltham Park, and Avery Hill. During the Great War Eltham was bombed by enemy aircraft. Pop. 13,450.

Eltham Palace was built towards the end of the 13th century. It probably owes its origin to Anthony Bec, bishop of Durham, who appears to have lived here from 1297 to 1311. At first a fortified manor house, it was subsequently converted into a royal residence. Its extant portions, viz. the great hall and part of the old kitchens adjoining, are fine examples of domestic architecture of the reign of Edward IV. The 15th century bridge across the moat, which still remains, led by way of a gatehouse to a large court, to the right of which stood the chapel and the royal apartments. The architecture of the palace is notable for the fine oriel windows, the open timber roof of the hall, and the gables, with beautifully carved barge boards, of the kitchens.

**Eltham.** Township of North Island, New Zealand. It is on the main line from Wellington to New Plymouth, from which it is distant 36 m. The chief centre of the Taranaki district, it has an extensive dairying industry. Pop. 1,711.

**Eltham, EARL OF.** Title borne by the eldest son of the marquess of Cambridge (*q.v.*).

**El Tineh.** Village of Palestine. It lies about 15 m. N. of Beersheba, on the branch rly. of the Lydda-



Eltham, Kent. Exterior of the banqueting hall of Eltham Palace, said to have been built by Edward IV

Jerusalem line, and is the junction for Gaza and Beersheba. It was captured by Australian troops Nov. 13, 1917. There is another El Tineh on an inlet of the sea, S.E. of Port Said, Egypt, near the ruins of Pelusium. See Palestine, Conquest of.

**Elton** or **YELTON**. Salt lake of Russia, in the govt. of Astrakhan. It lies on the border of the Kirghiz Steppes, 60 m. E. of the Volga. Area, 60 sq. m. Although it receives the waters of several streams, and has no outlet, it is very shallow, and strongly impregnated with salt, thousands of tons being extracted from it yearly. The Kalmucks call it the lake of gold.

**Elul**. Sixth month of the sacred and twelfth month of the civil year of the Jews, corresponding approximately to September. It is mentioned in the book of Nehemiah. See Calendar.

**Elutriation** (Lat. *elutriare*, to wash out). Process of obtaining mineral substances in a finely powdered condition by diffusing them in water after they have been ground or crushed. The coarser particles rapidly subside, and the water which still holds the finer particles in suspension is decanted into another vessel and the powder allowed to settle. The process is used for obtaining emery of different grades of fineness, and also for preparing jewellers' rouge free from gritty matter.

**Elvan**. Term applied by miners to the dykes frequently met in Cornish tin and copper mines. These dykes have been intruded into vacant spaces in the formations originally over them. In chemical and mineralogical composition they are identical with the granites of Cornwall, but their mechanical structure is different. They vary in width from a few feet to many yards, and have been often worked for tin. The word elvan is said to be derived from the Cornish term for a spark, elven, from the fact that the rock being hard emits sparks when the pick strikes against it. Other terms by which the rock is known are whinstone, granitic or quartz porphyry, and elvanite. Mineralogically it is a granular mixture of quartz and orthoclase. See Mineralogy; Tin.

**Elvas**. Frontier city of Portugal, in Portalegre dist. It stands on an affluent of the Guadiana, 170 m. E. of Lisbon and 10 m. W. of Badajoz, on the Lisbon-Madrid Rly. It has a Gothic cathedral, a 15th century aqueduct, and an arsenal. The manufactures include pottery and brandy, and the exports olives and plums. The Roman Alpesa or Helvas and the



Elvas. Fortifications of the city defending the Spanish frontier of Portugal

Moorish Balesh, Elvas is an historic place; it held out against the Spanish in 1658 and 1711, but fell to the French in March, 1808. Pop. 14,018.

**Elvey**, SIR GEORGE JOB (1816-93). British organist and composer. Born at Canterbury, March 27, 1816, he became a chorister at the cathedral and a pupil of the organist. In 1835 he was made organist of S. George's Chapel, Windsor, retaining this post



Sir George Elvey, British organist

until 1882. He was knighted in 1871, and died Dec. 9, 1893. Elvey's compositions are chiefly church music. See Life, M. Elvey, 1894.

**Elvira**, COUNCIL OF. Ecclesiastical assembly held at Elvira in Granada, early in the 4th century. It was attended by nineteen bishops, and put forth about eighty canons dealing with church discipline. It forbade the veneration of pictures in churches, ordered attendance at mass on Sundays, and enjoined celibacy on the clergy.

**Ellwell**, FRANK EDWIN (b. 1858). American sculptor and art critic. Born at Concord, June 15, 1858, he studied art under D. C. French at New York, and later at Paris under Falguière and at the Beaux Arts. He was the first American sculptor to have a statue erected in Europe. His work reproduces to some extent the characteristics of ancient Egyptian sculpture, of which he has made a profound study. He was curator of the sculpture section at the Metropolitan Museum, New York, 1902-5.

**Elwes**, JOHN (1714-89). British miser. Born April 7, 1714, son of Robert Meggott, on succeeding to

life of the utmost penury and

niggardiness, during which he let the estate go to ruin for want of repairs, he died Nov. 26, 1789. He left a fortune of over £500,000.

**Elwood**. City of Indiana, U.S.A., in Madison co. It stands on a small stream, 39 m. N.E. of Indianapolis, and is served by the Lake Erie and Western and other rlys. Situated in the natural gas district, it has large tinplate works, and manufactures flour, glass, and furniture. Formerly known as Quincy, it became a city in 1891. Pop. 11,028.

**Ely**. Episcopal city, urban dist. and market town of Cambridgeshire, England. Situated on an eminence on the left bank of the Ouse, in the Isle of Ely, 16 m. N.N.E. of Cambridge on the G.E.R., it is famous for its magnificent cathedral. In 673 Ethel-



Ely. Arms of the bishop

dreda founded a monastery here for monks and nuns, and became first abbess. It was destroyed by the Danes in 870, and in 970 was refounded as a Benedictine monastery by Ethelwold, bishop of Winchester.

The present cathedral was begun by Abbot Simeon in 1083. It embraces every style of architecture from Early Norman to Late Perpendicular. It is 537 ft. long and 189 ft. across the great transepts. The W. portion of the nave and W. tower were added in 1180; the fine Galilee or W. porch was completed about the beginning of the 13th century; the choir was

the estate of his uncle, Sir Hervey Elwes of Stoke College, Suffolk, he assumed his name. The estate having been originally much encumbered, habits of frugality had turned Sir Hervey into a miser, and John Elwes proved an apt pupil. Good-hearted by nature, and of unimpeachable honesty, he was kindly to all but himself. After a



John Elwes, British miser



Ely. The cathedral viewed from the west. The 12th century west tower and Galilee porch; to the right, the south-west transept and tower, of Transitional Norman architecture

*Photocolor*

erected between 1235-52; the beautiful Decorated octagon tower and lantern (170 ft. high), finished in 1328, took the place of the central tower, which collapsed six years earlier; the lady chapel (now the parish church) dates from 1321-49. Since 1845 the edifice has undergone general restoration. Within the cathedral's precincts are the Tudor bishop's palace, the King's School (1541), and a theological college. Ely became a bishopric in 1109. Market day, Thurs. Pop. 7,917.

**Ely, MARQUESS OF.** Irish title borne since 1800 by the family of Loftus. In 1771 Henry Loftus, an Irish landowner, was made earl of Ely, taking his title from Ely in Fermanagh. The title died with him in 1783, but his nephew, Sir Charles Tottenham, Bart., inherited his estates and took the name of Loftus. He was postmaster-general and was made a baron in 1785. Other Irish honours followed, cul-

minating in a marquessate in 1800, the reward for his support of the union of 1801, when he was made a baron of the United Kingdom.

**Elyot, Sir THOMAS** (c. 1490-1546). English diplomatist and scholar. A native of Wiltshire, he was knighted by Henry VIII and sent on several embassies. His most famous work is *The Book named The Governor*, 1531, the first on the subject of education written and printed in the English language (see edition, with life of Elyot, by H. H. S. Croft, 1880). He also compiled a Latin-English dictionary, 1538.

**Ely Place.** Cul-de-sac near Holborn Circus, London, E.C. It occupies part of the site of Ely House,

the inn or hostel of the bishops of Ely, of which the church of S. Etheldreda, restored to Roman Catholic worship in the 19th century, was the chapel. John of Gaunt died in Ely House in 1399, and Henry VIII is said to have first met Cranmer here. The church, one of the most perfect examples of Decorated architecture in England, has windows E. and W. with exquisite tracery, and an un-restored crypt. Ely House was de-mised to the crown under Elizabeth, and transferred to Sir Christopher Hatton.

**Elyria.** City of Ohio, U.S.A., the co. seat of Lorain co. On the Black river, 25 m. W. by S. of Cleveland, it is served by the Baltimore and Ohio, and the Lake Shore and Michigan rlys. It trades in building stone obtained from local quarries, and has chemical, motor-car, paint, and lace manufactures, iron and steel works, and tanneries. It became a city in 1892. Pop. 19,503.

**Elysée.** Palace in Paris, the official residence of the president of the French Republic. In the Faubourg St. Honoré, a garden separates it from the Champs Elysées. It was built in 1718 for the comte d'Evreux, but passed later into royal hands, and was the residence of Madame de Pompadour. Others who lived here included Napoleon I and Napoleon III. After 1870 it became the official residence of the president.

**Elysium** OR THE ELYSIAN FIELDS. In classical mythology, the abode of the souls of the good after death. Some legends make Elysium a part of the underworld, others make it an island or islands in the Atlantic Ocean—the Fortunate Islands or Isles of the Blessed. Elysium is represented as a place of perpetual sunshine with flowery meadows and pleasant streams.

**Elytra** (Gr. *elytron*, covering, sheath). Horny sheaths or cases into which the fore wings have been modified in the beetles and certain other insects. They usually cover the back of the insect, and the hind wings are folded under them. See *Insects*.

**Elze, FRIEDRICH KARL** (1821-89). German student and critic. Born at Dessau, Anhalt, May 22, 1821, he studied at Leipzig and Berlin. Having published a life of Byron (1870), Eng. trans. 1872, and various works on the Elizabethan drama, he was appointed to the chair of English literature at Halle in 1875. His best known work is a biography of William Shakespeare (1876), Eng. trans. 1888. He died at Halle, Jan. 21, 1889.



Sir Thomas Elyot, English diplomatist  
*After Holbein*

**Elzevir.** Name of a family of printers which is given also to some famous books printed by them, e.g. pocket editions of the Greek Testament, Latin and Italian classics, and French memoirs. The firm, founded in Leiden in 1583 by Louis Elzevir, was carried on after 1655 at Amsterdam by members of the family until 1681, and ended in 1712. The first edition of the Caesar of 1635 is the acknowledged masterpiece in type, ornaments, paper, printing, and purity of text. More than 150 spurious Elzevirs are known to experts. The publications of the firm dated from 1626 to 1680 are generally the most valuable. See *Bibliotheca Curiosa: Catalogue of all Publications of the Elzevier Presses*, E. Goldsmid, 1888.

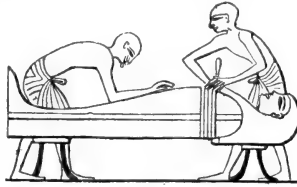
**Emanation** (Lat. *emanare*, to flow out). In philosophy, the theory that all things proceed from a higher original principle (as light from the sun), into which they are again received and absorbed. This form of pantheism, of eastern origin, was adopted by the neo-Platonists and developed by the Gnostics and Cabalists.

**Emanuel I** (1469–1521). King of Portugal. Born May 3, 1469, he ascended the throne in 1495. He inspired the expeditions of Vasco da Gama, Albuquerque and Cabral to Brazil, Goa, Malacca, and Sumatra. Under his guidance Portugal became the principal maritime power in the world. He died Dec. 13, 1521.

**Emanuel**, WALTER LEWIS (1869–1915). British humorous writer. Born April 2, 1869, in London, and educated at University College School and at Heidelberg, in 1896 he became a solicitor, but had already begun contributing to humorous periodicals. In 1902 his amusing comment on current matters, *Charivaria*, became a regular feature in *Punch*. He died in London, Aug. 4, 1915. His books included *Me and Some Others*, 1901; *A Dog Day*, 1902; *The Dogs of War*, 1906; *Never*, 1907; *Puck Among the Pictures*, 1908; *One Hundred Years Hence*, 1911.

**Emba** or **YEMBA**. Non-navigable river of Central Asia, in Uralsk and the Kirghiz Steppes. It rises in the Mugoj hills on the E. border of Uralsk to the N. of the sea of Aral, flows from E. to W., and falls into the N.E. of the Caspian Sea after a course of about 300 m.

**Embalming** (Fr. *em*, in, *baume*; Gr. *balsamon*, balm). Art of preserving dead bodies. Among the ancient Egyptians, and possibly



Embalming. Egyptian embalmers at work, from a relief

the Peruvians, embalming originated in the idea of the resurrection of the body. Herodotus describes three Egyptian methods. In the most expensive process, after removing the brains and intestines the abdomen was rinsed with palm-wine and filled with myrrh, cassia, and other perfumes, and the incision in the left flank sewn up. The body was then steeped in natron (native sodium carbonate) for 70 days, washed, and wrapped in gummed linen cloths.

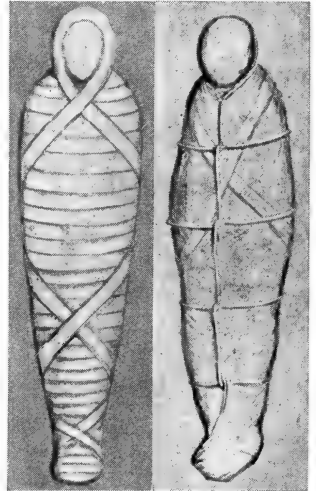
A less expensive method was to inject the body with *Kedria* (cedar pitch) in order to remove the intestines, and then steep it in natron. In embalming the poor the abdomen was rinsed in the substance known as *syrmæa* and the body steeped 70 days in natron. Usually the internal organs were embalmed and placed in jars. The Egyptians also embalmed cats, crocodiles, hawks, and other sacred animals and birds. See *illus.* p. 1503.

The ancient Persians apparently embalmed with wax, the Assyrians with honey, and the Guanches, the aborigines of the Canary Islands, in the Egyptian manner. Embalming has long been practised in Europe and is fairly common in the U.S.A. See *Burial Customs*.

**Embankment.** Mound of loose material artificially formed, or a bank supported by artificial means. Embankments may be classed as (a) embankments formed simply by tipping material and allowing the sides to assume the natural angle of repose of the material of which they consist, as in railway embankments; (b) reservoir embankments for containing and resisting the pressure of water; (c) embankments of earth or similar material retained, supported, and protected by walls, sheet piling, or other means.

Railway embankments, which consist for the most part of materials excavated in cuttings, serve the purpose of carrying a railway across a valley or depression, in order to avoid steep gradients; they are also constructed to raise

the level of railways across wide plains, especially where the soil becomes waterlogged, the necessary materials being obtained by excavating trenches known as borrow pits on either side of the line. When formed along the side of a hill a side excavation is usually made, the excavated material being utilised to form the bank portion, the sloping ground under the bank being first cut into steps to prevent side-slipping of the deposited material. Broken stone, gravel, and good sand are the best materials; wet clay and surface soil are liable to cause trouble and expense, as the initial angle of repose may become much flatter. An embankment should be made higher than its permanent level to allow for subsidence; the allow-

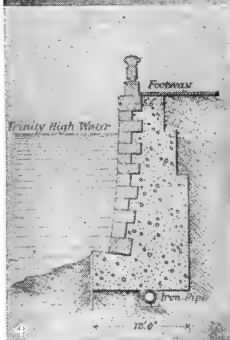
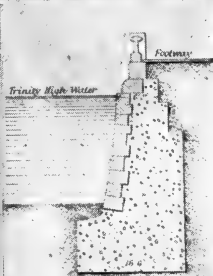


Embalming. Left, inner and, right, outer bandages wrapped by the ancient Egyptians round an embalmed body or mummy

ance varies from  $\frac{1}{2}$  to  $\frac{3}{4}$  of the height. Tipping should always proceed in a forward direction, as materials tipped sideways are liable to slip.

In first-class work the slopes are finally covered with surface soil for a depth of a few inches and either turfed or sown with grass seed, as grass binds the surface and tends to prevent washing away by rain. Embankments in still water should have their slopes pitched with stone; if subject to the action of waves or currents they should consist of rubble or be contained by walls. When a stream of water is encountered, a drain, culvert, or bridge is inserted. Along each side of an embankment a ditch is cut into which surface water drains, and by which it is carried and discharged into the nearest stream.





**Embankment.** 1. Thames Embankment, London, looking E. from Waterloo Bridge. 2. Embankment at Belvide reservoir, Staffordshire. 3. Sectional diagram of Thames Embankment at Lambeth, and, 4, at Chelsea. 5. Embankment on the National Transcontinental Rly. at James Bay, Canada

The angle of repose varies with different materials from  $14^{\circ}$  to  $37^{\circ}$ ; the range for materials usually employed is from  $26^{\circ}$  to  $34^{\circ}$ . Owing to the steeper gradients permissible, road embankments are not often necessary on a big scale, but, where constructed, the same rules apply as to railway embankments.

Reservoir embankments consist of earth or similar material lined inside with concrete or stone and rendered watertight by a vertical wall of clay puddle in the centre of the bank, extending from a foundation of impervious material to well above water level. Such embankments have to sustain the side pressure of the impounded water, and are made with slopes much flatter than the natural angle of repose.

A wharf contained by sheet piling with earth filling, or the protection or reclamation of a foreshore or

riparian land by a wall, may constitute an embankment. The term is popularly applied to riverside constructions whereby the banks are protected and retained by walls and have a road and footwalk sometimes ornamented with gardens.

**Embargo** (Span.). Term used in English law meaning an arrest of merchant ships. In time of war it has long been customary for a belligerent to lay an embargo upon the ships of the enemy found in its ports. Sometimes, without a declaration of war, an embargo has been laid on the ships of a state which has committed a wrong and has refused to make satisfaction for it. In such cases the embargo is used as an engine of pressure.

The term is used by analogy for prohibitions of other kinds, e.g. an embargo on places of amusement, on imports, and so on. See Blockade

○ **Embassy.** Term used for an ambassador and his staff collectively. It is also used for the building which serves as their headquarters, e.g. the British Embassy in Paris. By international courtesy the building is regarded as standing on the soil of the country to which the ambassador belongs. This means, for instance, that in the French embassy in London English law is not operative. Writs cannot be served there or orders of the court executed. See Diplomacy.

**Embattled, IMBATTLED, OR BATTLED.** In heraldry, a line of division, or outline, showing square projections like the crenellations or embrasures of a castle wall. The term crenellated is sometimes used.

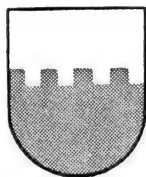
#### Ember Days.

In the Anglican and Roman Catholic Churches, fasts of the four seasons. They are the Wednesday, Friday, and Saturday after the 1st Sunday in Lent, Whitsunday, Sept. 14 (Holy Cross Day), and Dec. 13 (feast of S. Lucy). The weeks in which these days occur are called Ember Weeks. They were introduced into England by S. Gregory (590-604). Ordinations in the Anglican Church take place on the Sundays following the Ember Days, and in the R.C. Church on the Saturdays of the Ember Weeks.

**Embezzlement.** In English law, the wrongful appropriation to his own use, by a clerk or servant, of money received by him from his master. It must be distinguished from larceny by a servant. In the latter case the servant steals property which has been in his master's possession; in embezzlement he intercepts it. For example, if a shop assistant receives a shilling for goods sold and simply puts it in his pocket, and does not account for it to his master, it is embezzlement. If he puts it in the till, and then takes it out again and steals it, it is larceny by a servant.

**Emblem** (Gr. *emblēma*, an insertion). Originally meaning an ornament inserted on a mosaic or vase, the term is now generally used for an object or representation symbolic by reason of its connexion with another object, person, or event. It is also used for the marks used by printers to distinguish the work of their press.

○ In art the emblem has played an important part, especially in the representation of Christian saints, etc. The work of the old masters, and



Embattled in heraldry

the pages of old missals, Bibles, etc., are full of such representations. It has been estimated that the emblems of the saints number over 800, or including variant forms, over 3,000.

Among the commonest are the keys of S. Peter, the sword of S. Paul, the spiked wheel of S. Catherine, the lamb of S. John Baptist, the lion of S. Jerome, the dragon of S. George, the X-shaped cross of S. Andrew, the serpent of S. Patrick, the arrows of S. Sebastian. For the most part these objects are emblematic of the death suffered by the saint, or of miracles attributed to him.

Emblems are also given to various virtues and religious conceptions, e.g. the hand, marked with a cross or sacred heart, is found to stand for labour; a globe, surmounted by a cross and resting on a heart, for the reign of love and concord on earth; a lily for purity and the Virgin Mary. The patriarchs, prophets, and sibyls have their emblems, as Adam with a spade, Moses with the tables of the law, David with harp or sling, or Sibylla Agrippina with a scourge. An early emblem of Christ was a fish, the letters of the Gr. *ichthus*, fish, standing for Jesus Christ Son of God the Saviour. During the 15th century, when heraldry was at its height, armorial bearings incorporating many emblems were devised for almost 100 saints. See Hagiology.

**Bibliography.** Emblems of Saints, F. C. Huseinbleth, 3rd ed. 1882; Symbols and Emblems of Early and Mediaeval Christian Art, L. Twining, new ed. 1885; Saints and their Emblems, M. Drake, 1916.

**Emblements** (old Fr. *emblament*, harvest; late Lat. *implandare*, to sow). Term used in English law for certain rights of the tenants of a manor, e.g. the right to cut timber for the repair of the house and fences.

**Embolism** (Gr. *embolos*, stopper, plug). Obstruction of a blood-vessel by material which has been carried along in the blood-stream. The commonest cause of embolism is detachment of a blood-clot or portion of a blood-clot which has formed in a vein. Other substances which may form emboli are portions of growths on the heart-valves resulting from endocarditis, calcareous material from degenerated vessels, pieces of tumours, fat, masses of bacteria, and air bubbles.

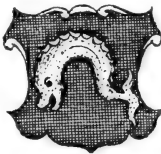
Embolism of a coronary artery may cause sudden death; embolism of the brain may lead to paralysis; embolism affecting the main blood supply to a limb leads to sudden pain, swelling, and pulse-

lessness, followed by gangrene in some cases and by recovery in others where other vessels enlarge and replace the blocked circulation. If the embolus contains infective micro-organisms, as, for instance, when it has been broken off from a septic clot, the result is often to set up an abscess where it lodges. Air may accidentally find entrance into the blood-stream during operations involving the large veins of the neck, and when the bubbles reach the heart they become churned up with the blood, leading to dilatation of the heart and sudden death.

**Embossing** (Fr. *em*, in; *bosse*, hump). In architecture, ornamenting a surface with decorative work in relief, obtained by hammering, stamping, or other mechanical force on metal or stone. Reliefs obtained by carving or casting cannot be termed embossed work. See Architecture.

**Embouchure** (Fr. *em*, in; *bouche*, mouth). In music, the part of a wind instrument through which it is blown. It is also used for the adjustment of the player's lips, teeth, and tongue to the mouthpiece of his instrument. Upon this adjustment depend the pitch, quality, and power of the tone produced. See Mouthpiece.

**Embowed.** In heraldry any charge which is bent, as an arm or a curved dolphin, is said to be *embowed*. A human limb is sometimes said to be "flexed."



Embowed in heraldry

**Embracery.** In English law, an attempt, whether successful or not, to influence a jury in favour of one party to a trial, whether by promise, persuasion, monetary bribery, treating, or the like. The person who attempts to so influence a jury is called an *embracoor*; and the same term is applied to one who comes into court to overawe a jury, or for reward, and speaks in favour of one party. It is a misdemeanour punishable by fine and imprisonment. The word is derived from old Fr. *embracer* (mod. *embrasser*), to set on fire, excite; to embrace, meaning to clasp in the arms, is from Fr. *em*, in; *bras*, arm (Lat. *brachium*).

**Embrasure** (Fr., aperture with sloping sides). Military term for the opening made or left in the parapet of a defensive work for a gun to be trained and fired through.

**Embrocation** (Gr. *embroché*, fomentation). Medicinal preparation intended to be rubbed into the skin. It is also known as liniment.

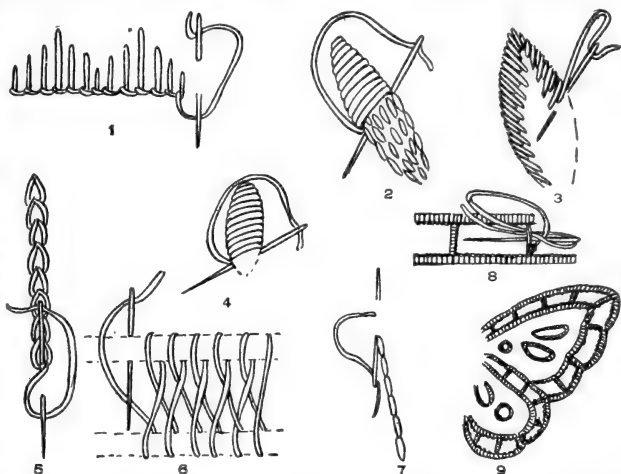
**Embroidery.** Art of decoration by means of needle and thread. Its practice is of the highest antiquity. There are references to it in the description of the Tabernacle, and Ezekiel (xxvii, 7) mentions "fine linen with brodered work from Egypt." Phrygia and ancient Babylon were renowned for their embroideries. The art was well known in ancient Greece, and to Greek workmanship of the 4th century is attributed one of the oldest specimens extant, in the Hermitage, Petrograd. The ground is purple cloth, upon which is sewn a palmette ornament in green and yellow.

In Christian times embroidery became the handmaid of the Church, and so the most ancient examples are ecclesiastical vestments. These were most ornate in very early times, for we learn of a Christian senator of Rome in the 4th century whose robe was decorated with no fewer than 600 figures representing incidents in the life of Christ. The oldest existing vestments are those at Arles, which date from the 6th century. In Durham Cathedral are a stole and maniple, found on the body of S. Cuthbert. Of ancient vestments, perhaps the most beautiful is the dalmatic in the Vatican reputed to be that of Charlemagne, but now attributed to the 11th century. One example of medieval embroidery that stands alone is the Bayeux Tapestry (*q.v.*).

In the 13th century English embroideries were without equal and the "Opus Anglicanum" was eagerly sought after. Matthew Paris states that in 1246 the pope, astonished at the number and magnificence of the vestments worn by the English bishops, sent letters to the English abbots urging them to procure a quantity for him. Apparently one of the characteristics of early English embroidery was the amount of gold, pearls, and precious stones. Examples of magnificent early English copes are exhibited in Ascoli-Piceno, Pienza, Anagni, Madrid, Toledo, South Kensington, and elsewhere. French and German embroidery reached a high pitch of excellence during the 13th and 14th centuries, as did also the Italian *ateliers* in Milan and Florence. These developed a realistic style which in the 16th century was characteristic of Italian work. In the 15th century English embroidery deteriorated.

In W. Europe, embroidery was both a professional and amateur handicraft. In the Middle Ages the lady of the castle during the absence of her lord on warlike or hunting expeditions passed her

time in embroidering scenes from Scripture, history and legend, or decorating banners with the family devices. The reputation of Queen Matilda was equalled by Catherine of Aragon, Bess of Hardwick, countess of Shrewsbury, and Mary Queen of Scots, who used to work at her embroidery all day long until very pain caused her to give it up. At that time the elaborate embroidery on ecclesiastical vestments was extended to secular dresses and furniture, and cross-stitch or *petit point* came into use for panels and cushions. Magnificent bed-curtains ornamented with trees and large leaves full of elaborate detail were made in the Jacobean period, while that of Charles I is characterised by the highly raised style known as "stump work." A return to simplicity in the early 18th century is seen in the powderings of natural flowers worked in chain-stitch on a light ground, and many beautiful samples of the period yet remain. Under the Hanoverian kings, the highly ornate court dresses afforded excellent opportunity for the art of the needle, and the upholstered chairs were covered with cross- and tent-stitch work. Later the art sank to a low ebb in copying prints in black and white and slavish imitations of paintings, but the pre-Raphaelite movement, the revelation of Japanese art, and the study of Eastern examples have restored embroidery to a very high level.



Embroidery. Stitches in common use. 1. Buttonhole. 2. Long and short stitches. 3 and 4. Satin. 5. Chain. 6. Eastern or Oriental. 7. Back stitch. 8. Working diagram of cut work shown complete in 9.

There are many kinds of embroidery, such as cut-work, *appliqué*, couching, quilting, etc., while the principal stitches are chain, feather, satin, cushion, comb, cross, tent, lace, long-and-short, back, herringbone, buttonhole, and many Eastern stitches.

**W. G. Thomson**  
*Bibliography.* Needlework as Art, M. M. Alford, 1886; La Broderie du XI<sup>e</sup> Siècle jusqu'à nos Jours, L. de Farey, 1890-1900; English Embroidery, A. F. Kendrick, 1905; La Broderie (Les Arts du Tissage), G. Migeon, 1909; Art in Needlework, F. Day and M. Buckle, 4th ed. rev. 1914.

**Embrun.** Town of France. It stands above the Durance in the department of Hautes Alpes, being nearly 3,000 ft. high. Although a small place it has much historic interest. It was once the seat of an archbishop, and its magnificent cathedral, built in the 12th century, remains. Dedicated to Notre Dame, it has a fine tower and other

features. The palace of the archbishops is now used for public purposes, and there is an old tower, a relic of the fortifications which were pulled down in 1884. Pilgrims visited Embrun in the Middle Ages to venerate a picture of the Madonna painted on the cathedral door. A large Roman station, the place became a bishopric soon after 300. The bishops (later archbishops) were princes of the Empire and rulers of an extensive territory. The see was transferred to Gap in 1791. Pop. of commune, 3,556.

**Embryo** (Gr. *en*, in; *bryein*, to swell, teem with). Word used in various meanings. In a general sense it expresses an undeveloped idea or conception, the initial stage of anything. In biology it is the living creature which develops itself in the egg or womb; in botany, that part of the seed from which the plant is formed.



Embroidery. Examples of artistic designs. Left, rose and leaves, illustrating how the pattern traced on the cloth is followed. Centre and right, willow pattern design showing finished work and original tracing.

## EMBRYOLOGY: THE SCIENCE OF LIFE

J. Arthur Thomson, Regius Professor of Natural History, Aberdeen

*With the article on this department of the science of biology should be read those on Biology; Evolution; Life. See also Bacteriology; Cell; Eugenics; Heredity, etc., and the biographies of Darwin and other biologists*

Embryology (Gr. *embryon*, embryo; *logos*, science) is the science of the individual life-cycle, especially of the early stages during which a germ grows into a body. In other words, embryology is the science of individual development. From what looks like a minute drop of living matter, though it is doubtless a little world with intricate organization, of which the microscope gives us a hint, there is gradually built up a young bird or mammal, or some other creature, whether animal or plant. Out of apparent simplicity there arises obvious complexity, and this development is one of the most mysterious processes in the world.

In the great majority of cases the individual life of plant or animal begins in the intimate union of two germ-cells or gametes, a more passive egg-cell or ovum and a more active sperm-cell or spermatozoon. What follows refers chiefly to animal development.

**EGG-CELL OR OVUM.** In most animals the egg-cells or ova are formed by the multiplication of primitive germ-cells within the ovary. These primitive germ-cells are the unspecialised descendants of the fertilised egg-cell which developed into the body, and they retain its essential qualities. They increase in number by repeated division, and some of them increase in size and become unripe ova. It frequently happens that an ovum absorbs its less successful sister-cells, or that they form a protective and often nutritive covering (follicle cells) for it. In the ovary of the fresh-water Hydra and the marine Tubularia there is usually only one ovum left out of many.

### Formation of the Yolk

The egg-cell usually accumulates yolk-material, which may come to be enormous in amount. The yolk is furnished by the blood or other nutritive fluid of the parent, the follicle cells often acting as intermediary units; or it may be furnished by special yolk-glands. It accumulates in the ovum as globules or platelets mainly consisting of a substance called lecithin.

Around the egg are eventually formed sheaths or envelopes of various kinds: (a) a delicate vitelline membrane made by the egg itself immediately after fertilisation; (b) a follicular envelope secreted by the follicle cells; and,

it may be, (c) a hard shell formed by special glands in the walls of the oviduct. The follicular envelope is often formed before fertilisation, and is perforated by a minute aperture (the micropyle) or by several of them. Otherwise the spermatozoon could not effect entrance.

The calcareous shells of birds' eggs and the horny mermaid's purse round the eggs of skates and dogfish are formed after fertilisation. What is called a bird's egg consists of a hugely dilated egg-cell heavily laden with yolk, of a follicular envelope of some complexity around this, of a large amount of albumen or white of egg, of a tissue-paper-like shell membrane, and of the porous shell. Most ova are minute spheres, and the majority are microscopically minute. The nucleus of the unripe ovum is usually a vesicle full of clear nuclear sap (the germinal vesicle of the older embryologists), with grains of readily stainable chromatin material borne on fibres crossing the sap, and a dense corpuscle called the nucleolus.

### Plant Egg-cells

The egg-cell or oosphere of a flowering plant lies within an "embryo-sac," within the ovule, within the ovary. When it is fertilised, by a nucleus from the pollen-tube, it divides and re-divides to form an embryo. Thus the possible seed or ovule becomes a real seed able to germinate.

**THE SPERM-CELL OR SPERMATOZOON.** Primitive germ-cells, usually localised in a special reproductive organ or testis, increase in number enormously and decrease in size, becoming spermatocytes. These divide further into unripe spermatozoa or spermatids, which become mature spermatozoa. A typical spermatozoon is an extremely minute cell, hundreds of which might be suspended in a drop on a pin's head; it is sometimes only about  $\frac{1}{1000000}$ th of the size of the egg-cell which is often the size of a pin's head. In typical cases it shows three parts: the essential "head" consisting chiefly of nucleus, the mobile "tail" which is often fibrillated, and a small middle piece between them which bears a little corpuscle called the centrosome. The spermatozoa of threadworms and most crustaceans are of a different type, sluggish and inclined to be amoeboid. The spermatozoa of different ani-

mals differ considerably in detail. In flowering plants the male element is represented by a generative nucleus within the pollen-tube which grows out of the pollen-grain. In flowerless plants the male element is usually a motile antherozoid, as in ferns and mosses.

**MATURATION.** In the history of the germ-cells, both ova and spermatozoa, a remarkable process occurs which is known as maturation or reducing division. In the nucleus of the immature stages of the germ-cells there are a number of readily stainable bodies or chromosomes which separate from one another, and can be counted when division is going to occur. The number is quite definite for each species, e.g. 2 or 4 in the two races of the threadworm of the horse, 12 in the grasshopper, 24 in the mouse, and 24 in man. This definite "normal number," whatever it may be, is often (but not always) demonstrable in all the cells of the body as well as in the germ-cells.

In the mature ovum and the mature spermatozoon the number of these chromosomes is half the normal, therefore in one way or another, at one stage or another—for it seems to occur variously in different types—there is a process of reduction, by which, in the division, half of the whole chromosomes go to each daughter-cell, whereas in an ordinary cell-division each chromosome is halved longitudinally, and one set of halves passes to each daughter-cell. The peculiar kind of cell-division which occurs during the maturation of the germ-cells is called a reducing or meiotic division; the ordinary method is called an equation division.

### Reduction of Chromosomes

If we compare the chromosomes with the wooden matches in a box, a reducing division would be comparable to putting half of the matches into another box, while the equation division would be comparable to splitting each match longitudinally and then putting one set of halves into another box. When the egg-cell is ripening the nucleus moves to the periphery and gives off an abortive sister-cell, the first polar body, which often divides into two, but never comes to anything. The nucleus of the ovum then divides again and gives rise to a second polar body, which also comes to nothing. The reduction of the number of chromosomes is often effected in the formation of the first polar body, and there is a corresponding reduction in the penultimate division of the spermatocytes.

In the sperm-cell lineage a

spermatogonium divides into "spermatocytes of the first order"; each of these divides into two sper-

maternal hereditary contributions, (2) the restoring of the number of chromosomes to the normal,

matocytes of the second order; each of which divides again into two spermatids, which become spermatozoa. In this case all the four cells which are descended from a spermatocyte of the first order become spermatozoa;

in the egg-cell lineage the first polar body and the second polar body are useless. The whole subject is very difficult, but it is very important, for maturation probably affords opportunity for new arrangements among the hereditary qualities which are borne, in part at least, by the chromosomes. It is held by many that it is in the maturation-division that the germ-cells are segregated into two contingents differing in the hereditary factors they carry, as is suggested by the facts of Mendelian inheritance (see Heredity). According to others, the segregation of qualities is not confined to the reduction-division.

**FERTILISATION.** The intimate union of the mature ovum and the mature spermatozoon is called fertilisation. The head of the spermatozoon, penetrating the ovum, swells up and becomes the "male pronucleus"; it moves towards the reduced ovum-nucleus—the "female pronucleus"; the two coalesce to form one nucleus—the "zygote nucleus"—which will presently divide.

Fertilisation implies (1) the mingling of the paternal and the

(3) the introduction of a centrosome (along with the middle piece of the spermatozoon) which plays an important part in the subsequent division of the ovum, (4) a stimulus to the ovum to divide or the removal of some fetter that was keeping the ovum from dividing, and (5) a rapid

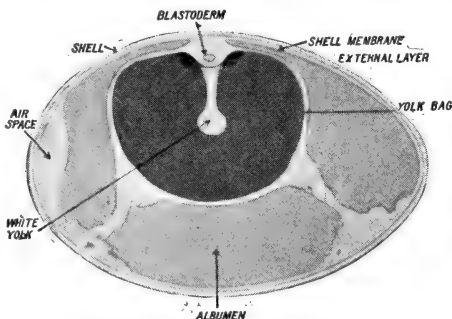
physical and chemical change in the periphery of the egg-cell which nips off the tail of the spermatozoon and makes the egg-cell non-receptive to other spermatozoa, the entrance of which would cause abnormal division.

By the brilliant work of Loeb, Delage, and others it has been shown that "artificial parthenogenesis" can be readily induced in a large number of ova (of starfish, sea-urchin, of some worms, molluscs, fishes, and of the frog) by a variety of mechanical, physical, and chemical stimuli. If the eggs of the sea-urchin be placed for a little while in sea-water whose composition has been slightly altered by the addition of a small quantity of magnesium chloride, they will develop without fertilisation and become larvae or even small sea-urchins when restored to sea-water.

If the eggs of the frog be pricked with a fine needle, washed in blood, and restored to fresh water, they will develop without fertilisation and become tadpoles or even frogs.

It should also be noted that in some cases the occurrence or non-occurrence of fertilisation determines whether the ovum is to develop into a female or into a male. Thus the unfertilised eggs of a hive-bee develop into drones. In other cases, where there are two kinds of spermatozoa, the nature of the fertilisation settles the sex of the offspring. Though the external features of fertilisation in plants are very different from those typical of animals, the essentials are the same. (See Sex.)

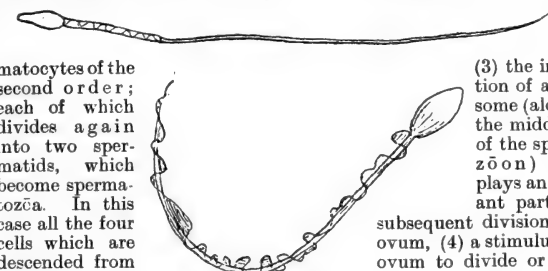
**SEGMENTATION.** On the heels of fertilisation comes segmentation or cleavage, the egg-cell dividing into many daughter-cells or blastomeres. The segmentation differs according to the amount and distribution of the yolk. Thus it may



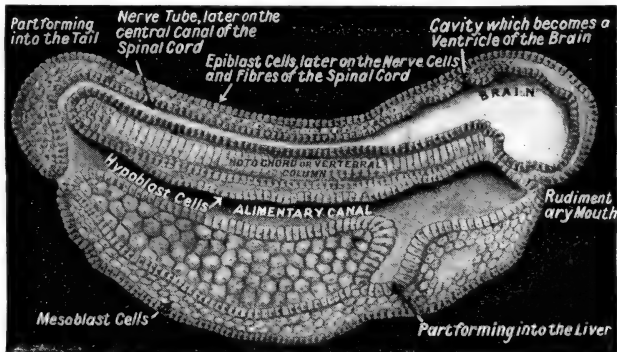
Embryology. Hen's egg shown in section

be total and equal (as in the sea-urchin) or total and unequal (as in the frog); partial and discoidal (in birds, reptiles, and most fishes); or partial and peripheral (as in most Arthropods). The result may be a solid ball of cells (morula), or a hollow ball of cells (blastula), or a disk of cells (blastoderm). In each division the chromosomes are split longitudinally, and in some cases it is possible for a time to demonstrate that each nucleus has half its chromosomes of paternal origin and half of maternal origin. But while the divisions bring about a scrupulously equal partition of the chromosome material (which may perhaps carry the essential germinal material of the race), there may be dissimilar division of the cell-substance of the ovum, so that different kinds of building material go to different cells.

In the fertilised egg-cell of one of the Ascidians or Sea-squirrels called *Styela* there are four or five different kinds of substance which occupy different positions, and



Embryology. Spermatozoon of man. Above, that of a horse



Embryology. Sectional view of the embryo of a frog, illustrating how the brain, spinal cord, vertebrae, and alimentary canal are among the earliest parts to form



are distributed in the course of development in different ways. They happen to have different colours, so that they can be followed. There is a yellow peripheral layer which gathers at the lower pole of the egg (where the spermatozoon enters) and there forms a yellow cap. It afterwards moves to form a crescent around the posterior side of the egg just below the equator.

On the anterior side of the egg there is a grey crescent, at the lower pole between the two crescents there is a slate-blue substance, and at the upper pole there is a zone of colourless living matter. Now, when the egg divides and re-divides the yellow crescent goes into those cells which will become muscle and mesoderm, the grey crescent into cells which become nervous system and the supporting rod called the notochord, the slate-blue substance into the endoderm cells lining the future food-canal, and the colourless substance into more ectoderm cells.

**GERMINAL LAYERS.** In many developing eggs which are not encumbered with much yolk material, a hollow ball of cells (a blastula) becomes in-dimpled or invaginated to form a two-layered sac of cells (the gastrula). The outer layer of cells is called the ectoderm or epiblast, the inner layer, the endoderm or hypoblast. The cavity which corresponds to the future digestive cavity is called the archenteron, and the mouth of the sac the blastopore. In sponges and stinging animals there are only two fundamental layers; in higher forms an intermediate layer, the mesoderm or mesoblast, is established. It is important to notice that these three layers give rise to the same sort of structures throughout the animal kingdom.

Thus the ectoderm forms the epidermis, the nervous system, and the foundations of the sense-organs. The endoderm forms the lining of the digestive tract and of outgrowths from it. The mesoderm forms muscle and connective tissue, and in many cases (e.g. all vertebrates) the skeleton. It is possible in many cases to go farther back, and point to certain particular cells in the segmented ovum which will form certain structures in the adult, and no others. An early localisation of organ-forming substance is often demonstrable, and it is a remarkable fact that an artificial disarrangement of the cells may be put right again by regulation processes which are very characteristic of development.

**DIFFERENTIATION.** As development proceeds new kinds of ma-

terial become evident; all sorts of different cells—nervous, muscular, glandular, connective, and so on—appear; tissues and organs arise. In a word, there is a mysterious process of differentiation. There is interaction between nuclear substance and cell-substance, there are movements and localisations of different kinds of building material, there are differential (i.e. dissimilar) divisions of the cell-substance into heterogeneous daughter-cells which are in some measure partitioned from one another. Thus, to use a metaphor, the developing embryo becomes like a garden in which different plots have come to have different kinds of soil, as well as different relations to one another and to the outer world. A similar handful of seeds, including a score of different kinds (corresponding to the nuclear material), is sown in each plot, but while each plot gets the same kind of seeds, those able to develop in each are different.

But while differentiation is in progress the developing body is also in-

**Bibliography.** Human Embryology, C. S. Minot, repr. 1897; The Cell in Development and Inheritance, E. B. Wilson, 2nd ed. 1900; The Science and Philosophy of the Organism, H. Driesch, 1908; Experimental Embryology, J. W. Jenkinson, 1909; Textbook of Embryology, ed. W. Heape, 1914, etc.; Heredity and Environment in the Development of Man, E. G. Conklin, 2nd ed. 1916.

**Emden.** Seaport and town of Germany. In the Prussian province of Hanover, it stands near the mouth of the Ems, 50 m. W.N.W. of Oldenburg, and is the terminus of the Dortmund-Ems canal. The port and its harbours are on a ship canal, which connects with the Ems, 2½ m. away, and other canals passing through the town. The chief ecclesiastical buildings are the Great Church, the Gasthaus Church, and the New Church. The Renaissance town hall, built in the 16th century, contains a valuable collection of firearms, and there are museums, colleges, schools, etc. Emden has a large shipping trade, and is an important fishing centre.



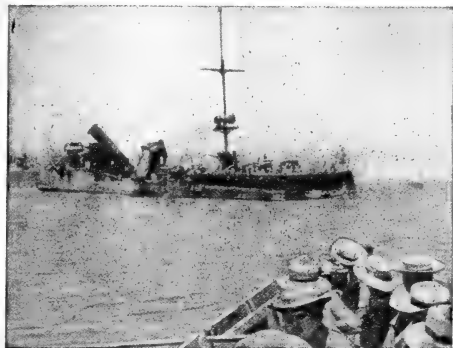
Emden. View of the inner harbour on the canal connecting the town with the river Ems

tegrated. That is to say, it becomes more and more of a unity, and nothing is more remarkable than the way in which different parts work into one another's hands, and conspire, as it were, towards a co-operative result. The germ is what it is because it has somehow had enregistered within it the many developments manifested in the past by the race to which it belongs. Development is the actualisation of this inheritance, and it comes about in such a way that there is in the individual, especially in the making of organs, a condensed recapitulation of the evolution which has been the work of ages.

In a general way the developing organism climbs up its own genealogical tree. It must further be noted that the development of the inherited nature always requires at least a minimum of appropriate nurture if it is to develop aright, and that the fullness of the development depends in some measure on the fullness of the nurture supplied. In this fact, as well as in the slow improvement of the breed, there is hope for mankind.

Shipbuilding is carried on. Originally a town in East Friesland, in 1595 it became a free city under the sovereignty of the Dutch Republic, and in 1744 it was handed over to Prussia. In 1815 it was transferred to Hanover, passing with that kingdom to Prussia in 1866. Pop. 24,000.

**Emden.** German light cruiser. A sister ship to the Dresden, she displaced 3,600 tons and had ten 4.1-in. guns. She was launched in 1908. During the Great War the Emden did much damage to British and Allied commerce. Von Müller, her commander, showed humanity by providing for the safety of the crews of the vessels he sank. While convoying Australian troops to England, the Australian cruiser Sydney learned that the Emden was at Cocos Island and drove her ashore at North Keeling Island and destroyed her, Nov. 9, 1914, with the loss of 230 of her crew. Müller, who was allowed to retain his sword, was among those saved. This was the first actual fighting done by any ship of the Australian



**Emden.** The German light cruiser when she had been driven ashore on North Keeling, one of the Cocos Islands, after her battle with the Australian cruiser Sydney

navy, and relics from the Emden were distributed to various Australian cities.

Another German light cruiser, built in 1915, was christened Emden in fulfilment of a promise made by the Kaiser when the first was destroyed that a new one should sail the seas. This vessel was among the warships surrendered to the Allies after the armistice, and was allotted to France in 1920.

**Emerald** (Gr. *smaragdos*, Fr. *émeraude*, Span. *esmeralda*). Green variety of mineral beryl, a metasilicate of beryllium and aluminium found in granitic or schistose rocks, and in veins traversing them. It crystallises in hexagonal system, and forms long six-sided prisms; it is valued as a gemstone on account of its colour. Perfect crystals are rare, many stones show "mossiness," due to tiny fissures and air bubbles, while the colour is often very irregularly distributed. Emeralds of antiquity came from Egypt; its mines, reopened in the 19th century, yield handsome stones, though generally small in size and rather pale in hue. The finest crystals come from South America, chiefly Colombia, and from the Urals; a few are found in Austria, Australia, and the U.S.A.

Certain other stones are known as emeralds. The "oriental" emeralds are Australian sage-green corundums; "Brazilian" are tourmalines; "Uralian" are green garnets; "lithia" are spodumenes; "evening emeralds" are bottle-green peridots; "false" are fluor-spar; while "mother of emerald" is green quartz; and "emerald copper" a diopside (a green silicate of copper).

Artificial emeralds are made by fusing together 4,608 parts of strass, 42 parts of copper oxide, and 2 parts of chromic oxide. A finer quality, known as "synthetic" or

"scientific emeralds," contains from 7 p.c. to 8 p.c. of beryllin, but, although almost identical with, are of lower specific gravity and refractivity than, the true stones, and are almost always "cloudy" or "mossy." "Emeraldines" are artificially coloured chalcedony.

**Emerald Green.** Name applied to certain green colouring matters. The two

mineral emerald greens are acetoarsenite of copper and hydrated chromium sesqui-oxide. The aniline dye known under this name is prepared by the action of benzaldehyde upon dimethylaniline and subsequent oxidation.

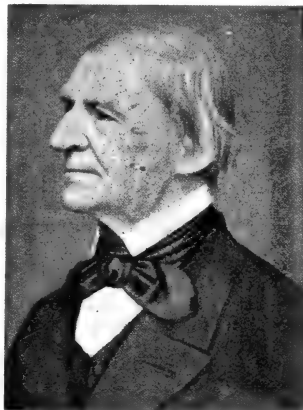
**Emergency Ration.** Ration carried by troops on active service or at manoeuvres to serve in the event of their being beyond reach of the ordinary daily issue. Also known as an Iron Ration, most stringent regulations are in force to prevent its consumption except in the last emergency. In the British army it consists of four biscuits, one tin of bully beef, and a small quantity of tea and sugar, all contained in a ration bag which may only be opened by order of an officer.

**Emerson, RALPH WALDO** (1803-82). American poet, essayist, and philosopher. He was born at Boston, Mass., May 25, 1803, the son of a Unitarian minister, and was educated at the Boston Latin school and Harvard. After graduating in 1821, he spent three years in teaching, and then, having entered the Unitarian ministry, was appointed joint minister of the Second Church in Boston, 1829. In the same year he married Ellen Louisa Tucker, who died in 1832, and in that year he resigned his ministry in consequence of his widened views, to which he had given expression in a sermon on the Lord's Supper (Works, vol. xi, 7), not meeting with the approval of his congregation.

In 1833 Emerson travelled in Europe, visited Carlyle, and began that lifelong friendship with him which bore literary fruit in a notable collection of letters. On returning to America he settled at Concord, Mass., and entered upon his career as writer and lecturer, which, in a few years, was to place

him in the front rank of American men of letters. The year after settling in Concord, he married again, his second wife being Lydia Jackson (1802-92). In 1836 he published a slim volume, *Nature*, in which he briefly stated the case for a new outlook on things in place of the continued acceptance of mere tradition. In subsequent addresses, lectures, and essays, the thoughts enunciated in *Nature* were enlarged upon and developed. In 1840 he commenced writing for *The Dial*, and edited it for two years; this magazine came to be regarded as the special organ of the New England Transcendental movement in religion, literature, and philosophy.

The first volume of those essays by which he was to become most widely famous was published in 1841, and a second series followed three years later. In 1847 the first collection of his poems was published, and in the autumn of the same year he revisited England on a lecturing tour, delivering a series of addresses on Representative Men—Plato, Swedenborg, Montaigne, Shakespeare, Napoleon,



*R. W. Emerson*

and Goethe. The volume containing these addresses was published in 1850. He had returned to Concord in 1849, and in 1856 the fruits of his observation during his extended stay in England were embodied in that admirable, and, on the whole, rarely discriminating volume, *English Traits*.

Writing and lecturing, he came to take a high position as the chief leader of American thought of his generation, and, despite some unfavourable comment on his somewhat staccato literary style, to be recognized in England as a great suggestive and stimulating writer.

Thus his successive works met with a cordial welcome on both sides of the Atlantic. In June, 1872, his house at Concord was partly destroyed by fire, a disaster which caused him a severe shock; it was, however, rebuilt by his friends and admirers, and he sought health by revisiting Europe, 1872-73. He died at Concord, where his house still stands, Apr. 27, 1882, and is buried in the famous cemetery of Sleepy Hollow, at that town.

The work which Emerson left, alike in prose and in poetry, is peculiarly individual. He was, perhaps, essentially a poet, but only in a small degree a singer; his verse, often marked with penetrating thought and lofty conception, is, for the most part, lacking in any beauty of form or music. Though a philosopher, his philosophy is that of the moment's consideration rather than that of any fully developed scheme; is, indeed, the philosophy of the poet rather than that of the scientist. It is, therefore, less as master of any definite course of philosophy than as a stimulator of thought along idealistic and optimistic lines that he exercised as great an influence as he did on his time. His position in this respect is perhaps best summed up in the words of Richard Garnett: "More than any of the other great writers of the age he is a Voice. He is almost impersonal. He is pure from the taint of sect, clique, or party. He does not argue, but announces; he speaks when the spirit moves him, but not longer. Better than any contemporary, he exhibits the enigma how Confucius, and Buddha and Socrates and greater teachers still should have produced such marvellous effects by mere oral utterance." The effect of his work, it has been said, is that of good and stimulating conversation, but it should also be said that it is conversation on a high and impersonal plane. His utterance has something of a finely-balanced sanity, and though at times it may suggest the mystic, it is the mysticism of a glorified common sense, not that of mere nebulousness.

Walter Jerrold

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Emerson. The old manse at Concord, Massachusetts, where Emerson settled in 1833, and where Nathaniel Hawthorne lived from 1842-46

son, F. B. Sanborn, 1901; Remembrances of Emerson, J. Albee, 1903; Emerson and his Philosophy, J. A. Hill, 1919.

**Emery** (Gr. *smiris*, old Fr. *émeril*, Span. *esmeril*). Dark, granular variety of mineral corundum, chemically an oxide of aluminium. In association with schistose rocks it occurs in Saxony, and in Naxos and other Greek islands. In the U.S.A. it is largely worked at Peekskill, New York, where deposits are probably segregations of the basic oxides in a norite rock. Owing to its extreme hardness, it is used for abrasive purposes, the commercial emery being a mechanical mixture of corundum, magnetite or hematite, and sometimes spinel.

**Emery, WINIFRED** (1862-1924).

Stage name of Isobel Winifred Maud Emery Maude, British actress.



Winifred Emery, British actress

Vandyk

ress. Born at Manchester, Aug. 1, 1862, and belonging to a well-known theatrical family, in 1888 she married Cyril F. Maude (q.v.). Her first appearance on the stage was at The Amphitheatre, Liverpool, 1870, as Geraldine in The Green Bushes. Her first London appearance was in pantomime at The Princess's, Dec. 1874. Her début as an adult was at The Imperial, Westminster, April 14, 1879, in Man is Not Perfect. A versatile actress, she appeared with Wilson Barrett, Comyns Carr, Forbes-Robertson and Beerbohm Tree. She accompanied Henry Irving to the U.S.A. in 1884 and 1887-88. She died July 15, 1924.

**Emetic** (Gr. *emetikos*). Drug which causes vomiting. Emetics are occasionally used as therapeutic agents in cases of simple illness. Dyspepsia and sick headache

caused by excessive eating may sometimes be relieved by evacuating the stomach of its contents. Another use is in conditions of difficulty of breathing caused by bronchitis, especially in children, the act of vomiting stimulating the respiratory mechanism and relieving the symptoms.

The great use of emetics is to remove poison from the stomach. This form of treatment may be adopted with safety in almost all cases where poison has been swallowed, except poisoning from strong mineral acids and carbolic acid, which are apt to corrode the stomach wall and render violent movement of the organ undesirable. Some knowledge of emetics should be possessed by every household, for the prompt administration of an emetic may avert serious symptoms, and even save life, which would be lost if treatment were delayed. The simplest emetics are a tablespoonful of mustard, or one or two tablespoonfuls of salt, in a tumbler of warm water. The following emetics should be taken only under medical advice.

**Zinc sulphate.** 10 to 30 grs. dissolved in half a tumbler of warm water, repeated if necessary. **Ammonium carbonate.** 15 to 30 grs. dissolved in warm water. **Ipecacuanha.** Four to six drams of the wine, or 20 to 30 grs. of the powdered root.

**Apomorphine** is best administered hypodermically in doses of  $\frac{1}{10}$  gr. This emetic stimulates the nerve centre in the brain which controls the process of vomiting, and is therefore particularly useful in poisoning by narcotics such as opium, or drugs, such as carbolic acid, which tend to produce loss of sensation in the stomach.

**Emetine.** Chief alkaloid found in the roots of ipecacuanha (*Cephaelis Ipecacuanha*). It is extracted by mixing the finely powdered root with an equal weight of lime, making into a paste with water, and after drying the mass, extracting it with chloroform. The emetine is dissolved by the chloroform, and after the evaporation of the solvent, remains behind. Emetine is a violent emetic, but in medicinal doses is a valuable remedy for certain forms of dysentery.

**E.M.F.** Abbrev. for electromotive force, a measure of the strength of an electric current.

**Emigrants' Information Office, THE.** Name formerly given to a department of the Colonial Office. Its function was to give information to intending emigrants, especially those going to other parts of the Empire. It is now merged into the Oversea Settlement Office (q.v.)

**Emigration** (Latin *e*, from; *migrare*, to change one's residence). Systematic migration of the surplus population of one land to another for the purpose of settlement. This movement has been one of the great factors in shaping the modern world, more potent even than military conquest. The military victor holds his possessions at the point of the sword, often over a rebellious people; settlers absorb the land and sooner or later obtain control of it.

The modern emigration movement began after the discovery of America, developing contemporaneously with the era of the merchant adventurers. Spain led the way, absorbing enormous areas in S. America and in the southern half of N. America. S. America is still overwhelmingly Spanish, in language, customs, and life. Portugal and Holland played no inconsiderable part, but Spain's main rivals were France and Britain. The enterprise of the merchants of Bristol gave Great Britain a foothold in Newfoundland from which the British people spread to the Pacific in the W. and Mexico in the S. Everywhere, but especially in N. America, French and British found themselves as rivals in the race for new empire.

Religion played a large part in the first emigration movements. Zeal for the Catholic Church led Spain to attempt to establish on a large scale model Catholic nations in S. America. The effort to create new peoples to overcome the growing heresies of Europe influenced the French kings in their pious endeavours to build up New France along the banks of the St. Lawrence. The departure of the Pilgrim Fathers from Plymouth in 1620 for New England laid the foundations of the U.S.A. of to-day. A second great impelling force has been poverty. The most marked example of this was the steady exodus of the Irish people to America during the Irish famines in the 19th century. The third cause is love of adventure and ambition, of which the most striking instance is to be found in a large part of the emigration from England and still more from Scotland.

#### The Outflow from Europe

As Spain and Portugal declined, the outflow of their people ceased. The Dutch settlers in many parts—notably in the state of New York—were gradually absorbed in the English-speaking race. S. Africa remains the outstanding example of successful Dutch settlement, and is still mainly Dutch in language and institutions, al-

though British in government. France, defeated in her struggle for political supremacy in N. America after the Napoleonic wars, became one of the least migratory nations in Europe, but the province of Quebec still remains distinctively French under the British flag. Britain maintained the outpouring of her people. While she lost political control of a large part of N. America, the U.S.A. still remained British in speech, and the British stock predominated. The convict settlements of New South Wales and Tasmania gave way to the free British commonwealths of Australia and New Zealand. The growth of Australia and the opening up of the Pacific coast of N. America were enormously stimulated by the discovery of gold in California and Victoria in the middle of the 19th century.

The defeat of the liberal movement and the triumph of imperialism in Germany stimulated a German migration westwards, which militarism and poverty did much to encourage. The German people prefer not to settle in German-ruled colonies, and before the Great War went mostly to the U.S.A. and to S. America. After the war their migration to the U.S.A. was checked, and they tended to go in larger numbers to S. America, Poland, and W. Russia. Italy, Russia, and the states of South-Eastern Europe in the years immediately before the Great War were the main sources of European emigration.

#### Migration to the U.S.A.

The abundant industrial openings and the high wages of the U.S.A. have made it for many years the Mecca of the European emigrant. The flow of population early in the 20th century averaged 1,000,000 a year, and in 1914 was over 1,200,000. Three-quarters came from Russia, Italy, and Austria-Hungary. Most of this migration was closed down for a time by the Great War. The large German and Eastern European settlements, and the considerable negro population (9,827,763 in 1910, and rapidly increasing) present some of America's gravest social problems. Despite the large Eastern European immigration in recent years, the most considerable section of the foreign white stock in the U.S.A. is to-day English speaking.

Canada failed to draw any considerable number of new settlers until near the close of the 19th century. Then, partly on account of the closer settlement and growing scarcity of land in the U.S.A.,

a big movement, largely of farmers, started from there into the prairie provinces. This ran parallel with a movement from Europe. Between 1901 and 1911, the population rose from 5,371,135 to 7,206,643. In the next decade, owing to the war and economic difficulties, the growth was slower, but by 1920 the population exceeded 8,000,000. The Dominion Government showed a certain timidity in dealing with immigrants immediately after the war, partly owing to fear of the Labour vote. Australia had gone through a similar experience earlier, but, learning better, launched out on fresh schemes for attracting immigrants.

#### Japanese on the Pacific Coast

One of the most significant movements of recent years has been the large Japanese emigration all over the Pacific coast and islands due to the rapid growth of Japanese population. This has given rise to serious difficulties with the white nations of the Pacific, more particularly with the people of California, who have caused deep offence in Japan by carrying exclusive legislation. The Japanese claim the right to be treated like white men. The Californians say that for them to do so would involve the Japanese absorption of their land. Despite all repressive legislation there are close on 90,000 Japanese in California alone. The Japanese are a majority of the population in Hawaii, they are spreading through Eastern Siberia, and they have settlements in almost every port or trading centre in Eastern Asia. See Alien; Immigration; Population.

F. A. McKenzie

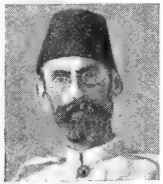
**Emigrés.** Term applied to Frenchmen who sought refuge in foreign countries during, and immediately after, the French Revolution. Most of these supporters of the old régime went to the Rhenish states of Germany, but everywhere actively advocated the restoration of the Bourbon dynasty. Their hopes of a speedy accomplishment of this object were shattered when the French Revolutionary armies defeated the Prussians and their allies at Valmy in 1793. After the final overthrow of Napoleon in 1815 the *émigrés* who were still alive or had not permanently settled abroad returned to France. See French Revolution.

**Emilia.** Administrative division of N. Italy. It slopes from the Apennines to the river Po, and facing the Adriatic. The name is derived from the Roman Via Aemilia, the great N. road which passed through the territory. The

compartimento includes the provs. of Bologna, Ferrara, Forli, Modena, Parma, Piacenza, Ravenna, and Reggio Emilia. Low-lying along the coast, it is elsewhere hilly, and is drained by tributaries of the Po. Area, 8,042 sq. m. Pop. 2,809,187.

**Eminescu, MIHAIL** (1849-89). Rumanian poet and editor. Born at Ipateshti in Moldavia, Dec. 26, 1849, he was educated at the universities of Vienna, Jena, and Berlin. In 1870 he contributed two memorabile poems, *Venere si Madona*, and *Epigonii*, to the *Convorbizi Literare*, and in 1874 he was appointed school inspector and librarian in the university of Jassy. He died at Bukarest, June 15, 1889, and is regarded as a great lyric and satiric poet.

**Emin Pasha** (1840-92). German administrator. Born at Oppeln. Silesia, March 28, 1840, of



Emin Pasha, German administrator

Jewish parents, his real name was Edward Schnitzer. After studying medicine at Breslau and Berlin, he took up an appointment on the staff of Hakki Pasha, in Turkey, and adopted a Turkish name. In 1876 he went to Egypt, and in 1878 was appointed by Gordon governor-general of the Equatorial province. When the Sudan was abandoned in 1883, Emin was left in the heart of the country, whence he was rescued by Stanley in 1889. Returning to Equatoria in the German service, he met his death at the hands of Manyama Arabs in Oct., 1892. His success in abolishing the slave trade in the district under his control, his careful survey of over 4,000 miles of road, and his observations of the flora, fauna, and meteorology of the country gained him an enduring reputation. See his *Letters and Journals*, Eng. trans. Mrs. R. W. Felkin, 1888; *New Light on Dark Africa*, C. Peters, Eng. trans. H. W. Dulcken, 1891.

**Emir.** Arabic word meaning commander, also spelt *amir* or *amir*. It is used for chiefs and other rulers of certain Mahomedan peoples, the form *emir* being mainly confined to those in Africa.

**Em'ly, LITTLE.** Character in Dickens's *David Copperfield*. A pretty and attractive girl, the niece and adopted daughter of the old boatman, Daniel Peggotty, and engaged to her cousin Ham, she runs off with David Copperfield's old schoolfellow, Steerforth, by whom she is ultimately abandoned.

**Emma.** Novel by Jane Austen, written in 1815 and published the following year. It is one of the best of its author's works, full of character and humour in the presentation of the society of Highbury, a "large and populous village almost amounting to a town."

**Emmanuel College.** One of the colleges of Cambridge University. It was founded by Sir Walter



Emmanuel College arms

Mildmay in 1584, but is now governed by statutes made in 1882. The head is the master, and there are both senior and junior fellows. The buildings in St. Andrew's Street date mainly from the latter part of the 16th century, although Wren designed the chapel. Those which they replaced belonged before the Reformation to a house of the Dominicans. The college names include Archbishop Sancroft, John Harvard, and Bishop Percy. It was long a stronghold of Puritanism.

**Emmaus.** Ancient town of Palestine. It is now represented by the village of Amwas, on the road between Jaffa and Jerusalem, noted for a medicinal spring. It is not to be confused with the Emmaus of the N.T., near which Christ appeared to His disciples after the Resurrection, the site of which is unknown.

**Emmen.** Town of Holland, in the prov. of Drenthe. It is 29 m. S.S.E. of Groningen, just N.W. of the Berger Meer, and on the road from Groningen to Koevorden. The inhabitants are principally engaged in agriculture and sheep and cattle rearing. Pop. 37,156.

**Emmerich.** Town of Germany in the Prussian Rhine province. It stands on the right bank of the Rhine, 5 m. from Cleves, and not far from the frontiers of the Netherlands. The chief building is the minster church, built in the 11th and 12th centuries, while another is the church of S. Aldegunde. A steam ferry crosses the Rhine here. Emmerich is an old place, having been a Roman settlement. In 1217 it was made a town; later it joined

the Hanseatic League, and as part of the duchy of Cleves it passed into the possession of Brandenburg in 1609. Having been for a few years part of Berg, it was returned to Prussia in 1815. Pop. 13,400.

**Emmet, ROBERT** (1778-1803). Irish nationalist. Youngest son of the physician to the viceroy, and



Robert Emmet, Irish nationalist  
After Petrie

brother of the United Irishman, Thomas Addis Emmet, he was born in Dublin and educated at Trinity College. Between 1800-2, Emmet travelled on the Continent, and was fired with the idea of securing French aid from Bonaparte in a rising against England. He succeeded in collecting arms at various depots in Dublin and drew up a full plan of campaign for a rising on July 23, 1803.



Emmanuel College, Cambridge. Chapel and cloister on the east side of the Great Court, the work of Sir Christopher Wren

J. Palmer Clarke, Cambridge

Treachery and faulty organization, however, frustrated his plans, and Emmet fled for refuge into the Wicklow Mts. On Aug. 25 he was arrested near Harold's Cross, was found guilty of treason, and hanged, Sept. 20, 1803. The hold of Emmet's memory on the popular imagination in Ireland was increased by the story of his love affair with Sarah Curran, daughter of John Philpot Curran (*q.v.*), a theme which inspired Thomas Moore's lyric, *She is far from the land where her young hero sleeps*.

**Emmich, OTTO VON** (1848-1915). German soldier. Born at Minden, Sept. 4, 1848, the son of a Prussian officer, he entered the Prussian army in 1866. He served in the Franco-Prussian War, 1870-71, and in 1909 he was general of infantry, and commander of the 10th Army Corps. On the outbreak



of the Great War, he was in command of the army of the Meuse that invaded Belgium and attacked Liège, which he captured on Aug. 7, 1914. In April-May, 1915, he took part in Mackensen's drive in Galicia. He died Dec., 1915.

**Emmott, ALFRED EMMOTT, 1ST BARON** (b. 1859). British politician. The son of Thomas Emmott, a Quaker cotton spinner of Brookfield, Oldham, he was born May 8, 1859. After graduating at London University, he spent some years in business at Oldham, and in 1899 was returned at a bye-election as Liberal M.P. for the borough. In 1906 he was chairman of ways and means in the House of Commons, a post he retained until 1911, when he was made Baron Emmott of Oldham. In the same year he was appointed under-secretary for the colonies, and in 1914 he became first commissioner of works, leaving office on the fall of the Asquith ministry in 1915. In 1918-19 Emmott was director of the War Trade Department. His Nationalization of Industries was published in 1920.



Baron Emmott,  
British politician  
*Elliott & Fry*

**Emotion** (Lat. *emovere*, to agitate). Mental state or feeling brought about by sensations, as contrasted with cognition or volition. Emotions are subjective and isolated. Thus, when I hate some one, I am conscious that I am the person who hates and that I hate a particular person who arouses the emotion of hate. I am concerned only with my particular hate and with the particular object of it. Love, hate, fear, anger, joy, sorrow are emotions. Emotions may be roughly divided into pleasant or unpleasant, to which others add those emotions that produce excitement or depression, tension or relief. The physical disturbance caused by emotion as a rule produces a corresponding external disturbance.

**Empedocles** (c. 495-435 B.C.). Greek philosopher of Agrigento in Sicily. He was the first to teach that all material substances are compounded from the four so-called elements, fire, air, earth, and water. These four elements are continually being separated and mingled by two moving forces, one Love or Friendship, the other Strife. He thus combined the Being of the Eleatics (q.v.) with the Becoming of Heraclitus (q.v.).

According to legend, Empedocles threw himself into the burning crater of Etna in order that the completeness of his disappearance might engender the belief that he had been translated alive to heaven. This legend is the subject of Matthew Arnold's *Empedocles on Etna* (1852). *Pron.* Emped-o-leez.



Empedocles,  
Greek philosopher

**Empennage** (Lat. *penna*, feather). French word used generally for the feathering or complete equipment of minor planes, fins, etc., at the tail of an aeroplane. It thus comprises the fixed tail or stabiliser, the vertical fin, the rudder, and the elevator. Empennage would be more accurately restricted to the tail plane and the fixed vertical fin. *See* Aeroplane.

**Emperor** (Lat. *imperare*, to command). Title applied to sovereigns of the highest class. It was first used in this sense by Julius Caesar, who, among other titles, called himself *imperator*, a title hitherto borne by certain officials while in command of troops abroad. His nephew Augustus established the empire, and the title was borne by his successors both in Rome and in Constantinople; it was taken by Charlemagne when, in 800, he founded the medieval empire. The rulers of the Holy Roman Empire bore it until the dissolution of that body in 1806, and in the 19th century it was assumed by several rulers who regarded themselves as more powerful than ordinary kings. Chief among these was Napoleon, who in 1804 assumed the title of Emperor of the French, an example followed in 1853 by Napoleon III.

While the English translated the word *imperator* as emperor and the French as *empereur*, the Germans had rendered it as *Kaiser*, a tribute to Caesar, and this was the title taken by Francis II when he became emperor of Austria in 1804. In 1871 William I took the title of *Deutscher Kaiser*, but in both these cases the idea was well represented by the English word emperor. Less correctly, perhaps, the Russian word *tsar* was freely translated emperor.

In the New World there were emperors of Brazil from 1821 to 1889, and in 1864 Maximilian of Austria took the title when he set up his empire in Mexico. The word is also used to translate the titles of rulers of E. countries: for in-

stance, we speak sometimes of the emperor of Japan. The British sovereign is called emperor of India, a translation of *Kaiser-i-Hind*, the title taken by Queen Victoria in 1876. The Greek word *basileus* is usually translated emperor. This was applied to certain rulers before the Christian era, and was afterwards taken by the emperors at Constantinople.

The original idea was that there could be only one emperor, whose authority extended throughout Christendom, and who was the overlord of kings. The modern tendency is to use it for the ruler of a collection of countries, but, although we speak of the British empire, it has, strictly speaking, no emperor. *See* Sovereignty.

**Emperor Butterfly** or **PURPLE EMPEROR** (*Apatura iris*). Large British butterfly, found locally in woods in the S.E. counties of England. It usually haunts the tops of oak trees and rarely visits the ground. In colour the male is dark brown, with a rich purple lustre; with a white curved band crossing the wings that bear white spots at the tips. The female, which is larger than the male, lacks the purple lustre. *See* Butterfly; also Fig. 23, on colour plate 2, following p. 1523.

**Emperor Moth** (*Saturnia pavonia*). Large night-flying moth, fairly common in many parts of Great Britain.

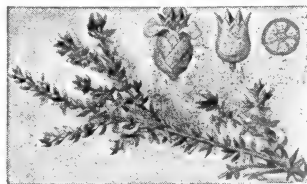


Emperor Moth,  
*Saturnia pavonia*

The wings are mottled brown and tawny, with a conspicuous eye in the middle of each, which readily distinguishes it from any other British species. The caterpillar feeds on the willow, bramble, heather, and other plants, *See* Moth; also illus. p. 454.

**Emperor Nicholas II Island**. Partially explored land N. of North East Cape, or Cheliuskin, Siberia. *See* Nicholas II Land.

**Empetraceae** (Gr. *empetros*, growing on rocks). Natural order of evergreen heath-like shrubs. They are natives of the N. temperate and arctic zones, and also of



Empetraceae. Leaves and fruit, also shown in section, of red crowberry

Chile and Fuegia. They have small, narrow, alternate leaves, and small, regular flowers, succeeded by fleshy berries. See Crowberry.

**Emphysema** (Gr., inflation). Condition in which the alveoli or air-cells of the lungs are over-distended with air and their walls atrophied. It is due mainly to long-continued increase of pressure of the air within the lungs and is most often seen in players on wind-instruments, glass-blowers, and sufferers from chronic bronchitis.

Emphysema produces enlargement of the chest, which becomes barrel-shaped owing to arching of the ribs and sternum; the costal cartilages frequently become calcified, and movement of the ribs during respiration is much diminished, breathing being effected chiefly by means of the diaphragm muscle. The symptoms come on gradually, the earliest being some difficulty in breathing and feeling of "tightness" in the chest. The incomplete oxygenation of the blood may lead to cyanosis or blueness of the face. The disease may persist for many years, but gradually becomes worse. Death may occur from pneumonia, or the long-continued pressure in the lungs may lead to dilatation of the heart and dropsy. Medical treatment is not of much avail. Sufferers are always worse in winter than in summer, and if possible the winter should be spent in a warm climate.

Subcutaneous or surgical emphysema is a condition in which air finds its way into the tissues of the body, most often due to an injury which has resulted in an abnormal communication between an air-containing cavity and the subcutaneous tissue. In rupture of a lung, for instance, air may pass under the pleura or lining membrane, and spread up into the root of the neck and over the chest, producing swelling and a characteristic crepitation on pressure. Fracture of the frontal sinuses or air-cells may lead to subcutaneous emphysema in the forehead.

**Emphyteusis** (Gr.-Lat., implanting). Term of Roman law. It meant the right to enjoy the fruits of property belonging to another, on payment of a *pensio* or rent to the owner. It applied not only to land and houses, but to other property, e.g. slaves. The lessee might not allow the thing to deteriorate in value; and was bound to pay the rent whether the thing was beneficial to him or not.

**Empire.** Word derived from the Roman word *imperium* and meaning rule. It was used to describe the lands ruled by an emperor, the

most powerful of temporal rulers, who claimed to be superior to kings. The Roman empire founded by Augustus was succeeded by the medieval empire, known as the Holy Roman Empire, and by the Byzantium empire at Constantinople. In the 19th century there arose the Austrian, French, and German empires, and in the New World those of Brazil and Mexico.

The word is used also for large states of the E., and we speak of the Chinese and Japanese empires. Moreover, the great states that existed before the Christian era are, for convenience, called empires, and we are familiar with a cycle of empires—those of Assyria, Persia, Macedonia preceding that of Rome. At present the tendency is to describe a federation of states as an empire, the great use of the word in this sense being for the British Empire (*q.v.*). See Rome.

**Empire, HOLY ROMAN.** Medieval institution that lasted from 800 to 1806. The Holy Roman Empire was born on Christmas Day A.D. 800, when Charlemagne was crowned emperor by the pope. It expired in 1806, when Francis II dropped the ancient title and called himself emperor of Austria.

From A.D. 475 to A.D. 800 Constantinople had been the seat of the lineal successor of the Roman emperors, whose supremacy in the W. had been a mere figment, while the bishops of Rome had asserted a claim to be the spiritual head of Christendom in defiance of the E. authority whether temporal or ecclesiastical. Charlemagne made himself effective master of W. Europe, and the defender of the papacy against its enemies; and, as at Constantinople the empress Irene usurped the imperial throne, the pope crowned the Frankish king as the heir of the Caesars and Roman emperor. The actual title, the Holy Roman Empire, was adopted by Otto I in 962.

#### The Dominions of Charlemagne

The new Roman Empire, then, was at first co-extensive with the dominions of Charlemagne. The British Isles were outside it; so was Scandinavia; and so was the greater part of Spain. Roughly speaking, the line of the Elbe and the Adriatic Sea marked its E. boundary. Under Charlemagne's successors it was parted into three portions: the Latinised West, which retained the Frankish name, and was ultimately shaped into the kingdom of France; the eastern or definitely German section, which was gradually extended till it em-

braced all the German and some of the Slavonic peoples; and the central portion, lying about the rivers Rhine and Rhône, and including the greater part of Italy, of which, however, a S. remnant continued to be attached to the E. empire.

In spite of the division between the princes of the Carolingian house, one was recognized as enjoying a sort of primacy, and he bore the imperial title. But the Carolingian dynasty wore itself out by the beginning of the 10th century in the eastern and middle kingdoms; with the result that France became independent, while the supremacy in the empire passed to an elected German king, who himself only bore the imperial title when he had been crowned in Rome. Fragments of the middle kingdom were attached to France, but the greater part of it was included in the empire.

The first German king was Henry the Fowler; under his son Otto the Great, the Holy Roman Empire was reconstituted. There was no hereditary right of succession to the German kingdom; but the descendants of a powerful emperor usually retained the succession for generations. The ruler was therefore German king by a mixture of election and descent, for the elected king was more frequently than not a son or near relative of the late ruler.

#### Great Congeries of Principalities

A custom grew up by which, in order to avoid an electoral struggle on the death of an emperor, the future emperor was designated during the lifetime of the reigning one, and he bore the title of king of the Romans. The Empire in fact was a great *congeries* of principalities large and small, lay and ecclesiastical, of which one of the princes was the official head, by right of election and by sanction of the exercise of physical force superior to that of rivals or recalcitrants. From the middle of the 10th century to the middle of the 13th the emperor is in the first place a German prince having a limited authority over the rest of the German princes. In the second place he is the legal overlord also of Italy; the tradition and title of the Empire fosters in the emperors a desire to be Roman Caesars rather than German Kaisers. Thirdly, the emperors incarnate the idea, but not the fact, of Christendom as a unity.

But beside the Empire as unifying Christendom stood the papacy, actually dominating the entire ecclesiastical organization of Western Christendom, claiming for the

pope a spiritual supremacy overriding that of the emperor as the temporal head of Christendom; and overriding that of all temporal authorities whatever within their own dominions. Theoretically, the papacy did not claim to exercise control over things temporal. But practically the lay and ecclesiastical interpretations of the spiritual and temporal spheres of control differed and overlapped, so that there was an endless contest of authority. Thus we have the emperors in their fourth aspect, as the supreme representatives of secular authority in antagonism to ecclesiastical authority, in the contest between Church and State.

#### Guelfs and Ghibellines

The Saxon emperors, Henry and the three Ottos, finally rolled back or stemmed the advance of more barbarian races on the E., and penned the Magyars into Hungary. They dominated the papacy, nominating several of the popes. They were followed in the 11th century by the Franconian or Salian series, Conrad II and Henry III, IV, and V. The reign of Henry IV was marked by the struggle between the emperor and Pope Gregory VII, with whom begins the great period of papal domination. With Henry's death the rivalry opened in Germany between the Saxon house of the Welfs, or Guelfs, and the Swabian house of the Hohenstaufen.

The Swabians secured the imperial crown for some generations; hence the anti-imperialists in Italy adopted the name of Guelph as a party title, while the imperialists were called Ghibellines. The emperor Frederick Barbarossa (1152-90) was worsted in his struggle with the popes, while the cities of Lombardy succeeded, after a hard struggle, in securing their liberties; but in Germany he broke the power of the Guelfs and established his own supremacy, which was maintained by his successor, Henry VI. Henry, by his marriage, acquired the kingdom of Sicily; his son, Frederick II, the last Hohenstaufen emperor, succeeded to the empire after an interval of contest between other rivals. But he was in effect a Sicilian, not a German. His reign and the strife which preceded it destroyed what Frederick I had done towards the unification of Germany itself. Frederick II's death in 1250 was followed by the great interregnum during which no imperial authority was recognized. It was brought to an end by the election of a minor prince, Rudolph of Hapsburg, 1273, who laid the foundations of the greatness of that famous house.

The medieval European system was now breaking up. The papacy lost prestige by its transference from Rome to Avignon. The imperial crown passed from one house to another; from Hapsburg to Luxembourg, from Luxembourg to Bavaria, from Bavaria back to Luxembourg. It was at this time that a group of German princes were definitely established as the electors with whom alone lay the right of fixing the imperial succession. Sigismund, son of the emperor Charles IV, acquired the kingdom of Hungary by marriage, though it was not brought within the imperial bounds as was Bohemia. With Charles IV the efforts of German rulers to maintain their position in Italy came to an end.

The reign of Sigismund, during the early part of the 15th century, is chiefly notable for the reinstatement of the papacy after the great schism at the council of Constance (1414-18), and also for the establishment of the first Hohenzollern margrave of Brandenburg, the progenitor of the kings of Prussia.

On Sigismund's death, in 1437, Albert of Hapsburg became king and emperor; and from his day until 1806 a Hapsburg was, with one exception, at the head of the Holy Roman Empire.

#### Effect of the Thirty Years' War

In 1519 Charles V succeeded his grandfather, Maximilian I, as emperor. His reign is contemporaneous with the development of the Reformation. The hereditary Austrian and other German estates of the house of Hapsburg were transferred to Ferdinand, the brother of Charles, and he succeeded his brother as emperor in 1556. The pacification of Passau, procured mainly by his agency just before his accession, gave Germany peace for some 60 years by establishing a compromise between the Roman Catholic and Protestant princes. The attempt of Charles V to establish the personal supremacy of the emperor throughout Germany, failed; German princes, big and little, were nearly independent sovereigns.

In the 17th century Ferdinand II, in the Thirty Years' War, sought to bring the Protestant princes into subjection, while Wallenstein, careless of the religious question, sought by means of the war to make the emperor absolute monarch of Germany. Both attempts failed. After the Thirty Years' War (1648) the independence of the greater German princes was an established fact, while the still nominal imperial authority was little more than a fiction. The

struggle of the next 100 years between Bourbon and Hapsburg was not a struggle between the Empire and France, but between the Hapsburgs and France. Although the war of the Austrian succession included a contest for the succession to the imperial crown between the Bavarian claimant, Charles Albert, and Maria Theresa, the representative of the Hapsburgs, that was altogether a minor aspect of the struggle.

#### End of the Holy Roman Empire

Charles Albert was made emperor, but on his death the crown reverted to the Hapsburgs in the person of Francis of Lorraine, whose son Joseph II again aimed at establishing an imperial ascendancy by the consolidation of Hapsburg dominions within Germany. The attempt, however, collapsed when Frederick II of Prussia formed the Fürstenbund (League of Princes) to maintain the constitutional rights of the German princes—which meant in effect their freedom from any recognizable imperial control.

In 1792 the French Republic went to war, not with the Empire, but with Austria. It was Austria, not the Empire, which was brought to submission by Bonaparte in 1797, again by Moreau at the battle of Hohenlinden in 1800, and by Napoleon at Austerlitz in 1805, when Napoleon had already proclaimed himself emperor. There was no longer any plausibility in maintaining the pretence that there was one imperial head of Christendom, so in 1806 the emperor Francis dropped the title and the Holy Roman Empire ended.

The history of the Holy Roman Empire down to the 16th century is, in respect of one part of it, identical with the history of Germany, and, in respect of another part, is intimately bound up with the histories of Italy and of the papacy. In the 16th century it is practically the history of Germany; the emperor is the German emperor with no pretensions to being the Roman emperor or the head of Christendom. From the middle of the 17th century the emperor is the Austrian emperor; the German or Holy Roman Empire exists only in name, with the survival of constitutional forms, until even the name disappears in 1806. See Charlemagne; Electors; Golden Bull; Papacy; consult also The Holy Roman Empire, J. Bryce, 1864 and later; The Empire and the Papacy, T. F. Tout, 1898; The Medieval Empire, H. A. L. Fisher, 1898; The Close of the Middle Ages, R. Lodge, 1901. A. D. Innes

**Empire Day.** British imperial celebration held annually on May 24, the anniversary of Queen Victoria's birthday. The first official celebration was held in 1904. The movement was started in 1902 and unremittently carried on by the earl of Meath, whose aim was to introduce into schools a training that would produce patriotic citizens of the empire, special prominence being given to saluting the flag. The idea was quickly taken up and soon gained wide official recognition. At the earl's request the movement was taken over by the Royal Colonial Institute, 1921. ●

**Empire Powder.** Smokeless sporting propellant manufactured by Nobel's Explosives Company. It is of the type designated 33-grain powder, the nomenclature signifying that this weight of propellant is the normal charge for a 12-bore gun, and comparable to the standard charge of 82 grains of black gunpowder. It consists essentially of nitrocellulose, containing about 12.5 p.c. of nitrogen, with small quantities of barium and potassium nitrate. Powders of this type, which are also known as condensed powders, are greatly valued on account of the low recoil imparted to the gun, owing to the fact that the products of explosion are ejected from the muzzle with a higher velocity than the shot. See Ammunition; Explosives; Nitrocellulose; Smokeless Powder.

**Empire Style.** In decoration and furniture, a development of the Directoire style, an outcome of the admiration felt by the leaders of the French Revolution for Greek and Roman culture. The style was, therefore, severely classical in outline and decoration. As regards outline, the rectilinear was adopted, legs of tables and chairs were straight or tapered, round and fluted or reeded. Classic mouldings, capitals and pediments, with a few republican symbols and animal masks, were the principal decorative commonplaces.

With the Empire some of the solidity and simplicity of the Directoire disappeared. The furniture was rather light in construction, and while the straight line was the rule in contour, curved lines were introduced in the decorative designs, such as wreaths of laurels, olive and palm, dainty ribbon bows and lyres. Imperial symbols, such as the eagle, bee, and crowned N, replaced the republican designs, while the sphinx was also used. Medallion portraits and figures (painted, enamelled, or porcelain plaques) were used,

together with heavy gilded mountings of classic design. Much of the furniture was painted white, or gilded. White, gold, crimson, and dark blue were adopted for upholstery and hangings. The tripod and X legs are often seen. See Furniture.

**Empiricism** (Gr. *empeiria*, experience). In philosophy, the theory that regards experience as the only source of knowledge. It is closely akin to sensualism, the theory that all knowledge is only transformed sensation. The Stoics occupied a position midway between empiricism and idealism (*q.v.*), in that they considered the impressions made upon the soul through the sensations to be alone certain, but held that the truth or falsehood of these impressions depended upon their being characterised by an arresting power of conviction.

The founders of empiricism in modern philosophy are Hobbes, who maintained that all knowledge comes from the senses and that the activity of the mind merely consists in combinations of words, and Locke, according to whom the mind is a blank slate indebted for all its knowledge to the senses, which give it sensation and the perception of external objects, and to reflection which is exercised upon the operations of the mind. In more recent times its chief upholder is John Stuart Mill. See Philosophy.

**Employers' Liability.** Legal term for the liability of an employer for injuries to his employees. By the common law of England, when a servant was injured in the course of his employment through the fault of a fellow-servant acting in the scope of the same employment, the employer was not liable. This was held in *Priestly v. Fowler*, 1837, where a butcher's man was hurt through a fellow-servant overloading the van, and in *Hutchinson v. York Railway*, 1850, where a railway servant was killed in an accident caused by a fellow-servant's negligence.

Neither the Employers' Liability Act of 1880 nor the Workmen's Compensation Acts abolishes this doctrine. The former Act gives right of action for damages to persons engaged in manual labour other than domestic servants on account of (1) defect in machinery through master's or fellow-servant's negligence; (2) negligence of responsible official; (3) wrongful act done in obedience to byelaws of firm or its authority; (4) negligence on the railway. A master's negligence rendering him liable may consist in employing a person knowing him to be incom-

petent or retaining in his service an habitually negligent person, or allowing premises to be in a dangerous condition.

The doctrine of common employment is a good defence, except in the above category. It has been held that miners and surface-men, and a chorus girl and a scene-shifter are fellow-servants for this purpose. But the rule does not apply where A, the injured man, is employed by a contractor, and B, who caused the accident, is the servant or contractor's employer. It has been held that the Employers' Liability Act does not apply to a tram-driver, a bus conductor, or a grocer's assistant, nor in the case of accidents not coming within the above categories.

Except in the case of death notice of claim must be given within six weeks of the accident; action at law must be begun within six months in case of injury, and within a year in case of death. Process must be taken in the county court, damages being limited to three years' earnings. Good defences include (a) the workman has contracted himself out of the Act; (b) contributory negligence; (c) *Volenti non fit injuria* (consent does away with injury).

The Workmen's Compensation Acts give nearly every class of servant the right of compensation for all accidents arising out of their employment. Where a sufferer can proceed either for damages at common law or under the Employers' Liability Act, or for compensation under the Workmen's Compensation Acts, he must make his choice.

In addition to the Acts above cited, Lord Campbell's (Fatal Accidents) Act, 1846, also concerns the liability of employers. It enables the wife, or husband, or parent, or child of a workman, or any other person whose death is caused by the wrongful act or neglect of another, to claim damages, provided that the claimant has suffered some loss, *e.g.* of education or support, which can be appraised in money. Process must be begun within a year of the death. The jury apportions the damages among those entitled where there are more than one. The Act does not apply to Scotland. See Workmen's Compensation.

**Employment Exchange.** British organization for bringing employer and employee into touch. Previously known as labour exchange (*q.v.*), the name was altered in 1916 to employment exchange. Labour exchanges are found in the principal countries of Europe, but their existence in the United

Kingdom is of comparatively recent date. They were established under the Unemployed Workmen's Act, 1905, and managed by local authorities. The royal commission on the Poor Laws and Relief of Distress, 1909, recommended the setting up of a national system of labour exchanges to deal with unemployment. The Labour Exchanges Act of that year provided the necessary machinery, and the first exchanges under the Act were opened Feb., 1910. Their control was placed in the hands of the board of trade, with general advisory committees in principal centres. Exchanges exist in all the larger, and also in many smaller, towns and country districts.

As first established in 1910, their functions were to act as a clearing house for labour, and to bring master and man into touch. They formed the basis of the unemployment section (Part II) of the National Insurance Act of 1912. No fees were charged, and the system was purely voluntary. The organization was solely industrial.

Originally the exchanges were of much use in coping with prevailing unemployment and the disorganized casual labour conditions. Men of the labouring class used them in particular. They entered their names at the local exchange, and called daily until suited. Registration of application for work held good for seven days from date of registration, but could be renewed within that period for a like term. Employers registered their requirements at the exchange, and in this way master and worker were put into touch with each other. The exchanges took no responsibility with regard to wages or other conditions, but were merely the agents whereby a man found work.

During the earlier part of the Great War the exchanges did much to maintain industries and munition establishments, and later on placed a large number of discharged sailors and soldiers in civil employment. With the end of the war, Nov., 1918, they were confronted by serious difficulties, as not only the demobilised service men, but demobilised war workers at home were thrown upon their organization. In addition to providing work, and administering the unemployment insurance scheme, they had to administer the out-of-work donation which was paid both to ex-soldiers and munition workers, male and female. The work done by the exchanges in the period of resettlement, 1918-20, was, therefore, very onerous and responsible. Later the exchanges came under the control of the

ministry of labour, under whose auspices domestic servants were dealt with, and a scheme for the co-operation of private registry offices with the exchanges was inaugurated in Oct., 1919.

At the end of 1919 there were 414 exchanges, and 1,203 branch exchanges in operation. The total cost of the employment exchange service during the six months ended June 30, 1919, including the cost of special war services chargeable to the vote of credit, and all expenses incurred at divisional offices, was £1,500,000. The numbers of individuals who applied to the exchanges since their institution in 1910, and the numbers placed in employment, down to 1919, were as follows:

Year	Individuals applying	Individuals placed
1910	1,127,447	(Not known)
1911	1,513,369	469,210
1912	1,643,587	573,709
1913	1,871,671	552,306
1914	2,164,023	814,071
1915	2,326,803	1,058,336
1916	2,843,784	1,351,406
1917	2,837,650	1,375,198
1918	3,045,263	1,324,743
1919	5,003,786	1,137,875

The out-of-work donation paid through the exchanges between November 11, 1918, and June 18, 1920, was £53,209,000, of which £30,813,000 was paid to ex-service men and women, and £22,396,000 to civilians. The number of separate payments was 42,350,000, of which 21,973,000 were to ex-service men and women, and 20,377,000 to civilians. Criticism having been directed against the exchanges on the grounds of their cost to the nation and practical use, a committee was appointed by the ministry of labour in June, 1920, to examine their working and administration. See Labour; Unemployment; Wages

G. A. Leask

**Empoli.** Old town of Italy in the prov. of Florence. It stands on the Arno, 20 m. by rly. W. of Florence, in a fertile district. The collegiate church, founded 1093, retains part of its curious original facade; its pictures are mostly housed in a neighbouring gallery. Jacopo Chimenti, the painter, was a native. It has manufactures of cotton, leather, glass, and art pottery. Pop. 21,566.

**Empress.** Feminine of emperor. It is a corruption of the Latin *imperator*, and is applied by courtesy to the

wives of emperors and also to the few women who have ruled over an empire. Maria Theresa was an empress or kaiserin as the Germans call it, and Queen Victoria was empress of India. The women rulers of the Byzantine empire, Irene, for instance, and Catherine and Elizabeth of Russia, are also known in English as empresses. See Emperor; Sovereignty.

**Empress of Ireland.** Passenger steamer belonging to the C.P.R. On May 29, 1914, outward bound from Quebec to Liverpool with 1,367 people on board, the Empress of Ireland was rammed by the Norwegian collier, Storstad, in the St. Lawrence river during a fog. The Empress of Ireland sank in ten minutes, and 934 persons went down in her.

**Empson** or **EMSON**, SIR RICHARD (d. 1510). English lawyer. Born at Towcester, Northants, he became member of parliament for that county, and speaker of the house in 1491, and, knighted in 1504, was made chancellor of the duchy of Lancaster. A favourite of Henry VII, he collaborated with Edmund Dudley (*q.v.*) in that king's obnoxious fiscal policy, and became universally unpopular for his harshness. After Henry VIII's accession he was tried on a charge of constructive treason, attainted by parliament, Jan. 21, 1510, and beheaded with Dudley on Tower Hill, Aug. 17, 1510.

**Empyema** (Gr., suppuration). Collection of pus in the pleural cavity—that is, between the layers of membrane lining the chest-wall and the lung. The condition may be due to infection from within, following simple pleurisy or septic pneumonia, or sometimes tuberculous broncho-pneumonia; less frequently to infections from without, as a result of fracture of a rib or a penetrating wound of the chest. The symptoms may begin suddenly with pain in the chest, sweating and rise of temperature, but when, as usually, the condition develops in the course of simple pleurisy or a morbid condition of the lung, there is no marked line of separation in the symptoms.



Empress of Ireland. C.P.R. passenger steamer rammed and sunk in the St. Lawrence river, May 29, 1914



Empyema is a serious condition, and if left untreated is likely to prove fatal. In mild cases it may be sufficient to draw off the pus by aspiration, but generally it is necessary to secure thorough drainage of the pleural cavity by making an opening between the ribs or removing a portion of a rib so that a large drainage tube can be inserted. This causes collapse of the lung on the affected side, but if the operation has been performed early there is a good prospect of the lung re-expanding after the discharge has ceased and the wound has healed.

**Ems.** River of Germany. It rises in Westphalia, in the Teutoburger Wald, and flows mainly in a N. direction through Westphalia and Hanover to the Dollart, an opening of the North Sea. Its length is about 210 m., and its chief tributaries are the Aa, Haase, Hessel, and Leda. It has been canalised as part of the system of German waterways. (See Dortmund-Ems canal.) Emden is at its mouth. On Oct. 6, 1914, the British submarine E 9 torpedoed and sank the German destroyer S 126 off the Ems river.

**Ems.** Town and watering-place of Prussia, Germany. It stands on the Lahn, in the prov. of Hesse-Nassau, 11 m. from Coblenz. It lies on both sides of the river, and is in three parts—Bad Ems, where the waters are; Spiess Ems, and Dorf Ems, the original village. There are some mines near by, but the town is chiefly known for its waters, these and the beautiful scenery attracting many visitors. For them there are many hotels and places of amusement of all kinds, including the Kursaal in extensive gardens and a theatre. The royal Kurhaus, where many of the springs and baths are, and the new bathhouse, have every comfort for those taking the waters. There is a wire rope rly. to the summit of the Malberg, one of the picturesque hills in the neighbourhood, and steamers on the Lahn. Before the Great War there was an English church here. The congress of Ems in 1766 drew up the Punctuation of Ems, a protest against the interference of the pope in the affairs of the church in Germany. Pop. 6,800.

**Ems Telegram.** Message published by Bismarck in 1870 which was the immediate cause of the Franco-Prussian War. France had just succeeded in obtaining the withdrawal of Leopold of Hohenzollern as a candidate for the throne of Spain, but put forward a further demand. On

July 13, 1870, Benedetti, the French ambassador, interviewed King William I, who was staying at Ems, and requested a promise that he would not allow the candidature to be renewed. The king refused, and later in the day declined to reopen the discussion. To Bismarck at Berlin he sent an account of the proceedings, and this was the Ems telegram.

Bismarck thereupon published the telegram with certain alterations, especially in that part of the message in which the king informed Benedetti that he could not discuss the matter further. These made it appear that instead of this being merely a courteous refusal to reopen the matter, it was a dismissal of the ambassador from his presence. Thus it was treated by France as a *casus belli*. The vital sentence was "His majesty refused to receive the French ambassador, sending word that he had nothing more to communicate."

**Emsworth.** Seaport of Hampshire, England. It stands at the mouth of the Ems, a small stream. With a station on the L.B. & S.C. Rly., it is 76 m. from London and 9 from Portsmouth. The port has a coasting trade and oyster beds. Pop. 2,200.

**Emu** (Port. *ema*, ostrich) (*Dromaeus novae-hollandiae*). Large bird belonging to the division Rati-tae. It is found only in Australia and certain neighbouring islands. The second largest bird now living, it is only exceeded in size by the ostrich, which it somewhat resembles in general build. But the wings of the emu are more rudimentary, and the bird depends entirely on its swiftness as a runner to escape its foes. The slender feathers are brown, mottled with grey, but the younger birds bear longitudinal stripes of lighter colour. Emus are rare except in the wilder parts of the country, where they live in small flocks and feed chiefly

upon small fruits. Although not web-footed, they swim well, and take to the water readily. They are hunted with dogs, and when brought to bay can deliver serious kicks. These birds are easily domesticated, and breed readily in captivity. The male, which is smaller in size than the female, incubates the eggs, which are green.

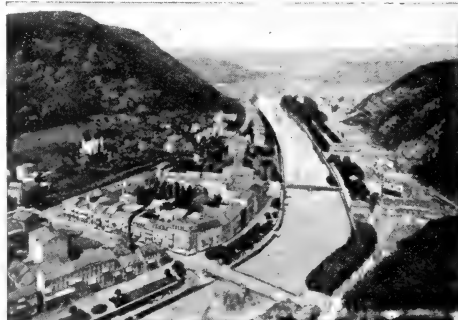
**Emulsin** (Lat. *emulsus*, milked out) OR SYNAPTASE. Unorganized ferment (enzyme) present in almonds and mustard seeds. The action of emulsin on the amygdalin also present in almonds produces essential oil of almonds in the process of manufacturing the expressed oil. Emulsin may be



Emu. Specimen of the large Australian bird

made from an aqueous extract of almond press cake by adding to it an equal volume of alcohol. The granular precipitate which falls is emulsin.

**Emulsion.** In photography, a mixture containing the silver compounds, sensitive to light, used in the manufacture of photographic plates and printing papers. Gelatin emulsions, by far the most commonly used, are made by forming the silver compounds in a hot solution of gelatin, which is allowed to set to a jelly, shredded and washed, and re-melted for coating on plates or paper, on which it rapidly sets. In collodion emulsions, the



Ems, Germany. Town and bathing-place standing in the valley of the river Lahn

sensitive compounds are dissolved or formed in collodion (*q.v.*), and are left distributed in the pyroxyline on the solvents evaporating from the coated materials. See Photography.

**Enabling Act.** Popular name for the National Assembly of the Church of England (Powers) Act, which became law in Dec., 1919. It was introduced by the archbishop of Canterbury in May, 1919, the object being to set up for the Church of England a national assembly with considerable powers for the government of the Church.

The national assembly consists of three houses, the two houses of convocation and a house of laity. It can discuss any proposal concerning the Church, and pass measures thereon, provided that such do not attempt to define the doctrine of the Church. Its decisions are then submitted to a legislative committee of Parliament, 15 members from each house, which reports upon them. They are then laid before Parliament, which simply by resolution can approve or disapprove. If a measure is approved it receives the royal assent and becomes law.

For electing members of the house of laity and for other purposes the Act sets up a roll of electors in each parish. These form a parochial Church council for the affairs of their particular church. The various diocesan conferences elect the members of the house of laity. See Church of England; Convocation; National Assembly; consult also Church Self-Government, P. V. Smith, 1920.

**Enamel.** Transparent or opaque glassy substance applied to metal or other surfaces in the form of a paste and then fired to fix it. The material—ground very fine, mixed with gum, water, or oil of spike to render it adhesive, and reduced to a pasty consistency—is brushed on to the object, which, when duly decorated, is placed in a furnace. In pots, pans, and culinary utensils an internal lining of enamel protects the iron body from oxidation when exposed to heat and wet or from corrosion by acids. The metal, after having been annealed to bear the heat, is dipped into the glaze and fired in a furnace at 1,500° F.

In the fine arts enamel is principally used in connexion with pottery and porcelain wares, jewelry, watches, snuff-boxes, plaques, and articles for the toilet table. The enamel may be applied by the enclosed method or *cloisonnée* (*q.v.*), the engraved or incised method or *champlevé*, and the surface method, in which the whole



Enamel. 1. Gold brooch with bust in cloisonné enamel, Italian, c. 7th century. 2. Gold brooch of German make with Byzantine cloisonné enamels, 11th cent. 3. Enamelled cross, attributed to Godefroid de Clare of Huy, late 12th cent. 4. Ciborium of Limoges work, 13th cent. 5. Plate in brilliant colours of Limoges work, c. 1530. 6. Pillar candlestick, Limoges, c. 1560

surface is covered with enamel on which the design is delicately painted and fired. Coloured enamels were used by the Egyptians, the Greeks, and Romans, but the art was brought to a high state of perfection under the Byzantine emperors. A special style was developed among the Orientals, while a kindred art of polychromed enamelling was carried out extensively in N. Europe. Of the surface style the enamels for which Battersea was noted in the 18th century are an example, while in

Limoges enamel, which was a variety of surface work, painting was carried to rare perfection by the practitioners of the 16th century. Copper was the metal customarily employed for this purpose, but gold and silver were sometimes used.

**Enare.** Lake in Finland, in the N. of the govt. of Uleåborg. It is fed by a number of rivers, and discharges its waters through the Pasvik into the Varanger Fiord in the Arctic Ocean. Its area is 550 sq. m. *Pron.* Enah-re.

**Enarea.** Plateau region of Abyssinia, S.W. of Shoa. It has hills attaining an elevation of 8,000 ft. above sea level, upon the slopes of which coffee grows in abundance. The people are an off-shoot of the Gallas. The chief town is Saka, near the Gibbe river.

**Encaenia** (Gr. *en*, in; *kainos*, new). Feast of dedication or renewing. It is used especially for an anniversary of the dedication of a church or temple. Among the Jews it is applied particularly to the anniversary festival of the dedication of the temple at Jerusalem. At Oxford University, Commemoration, the festival at the end of the academic year, when founders and benefactors are commemorated, is also known as Encaenia.

**Encalada**, MANUEL BLANCO (1790-1876). Chilean soldier and diplomatist. He was born at Buenos Aires, and having been educated at Madrid and the naval academy at Leon, returned to S. America, where he joined the revolutionary party. He was with Cochrane (earl of Dundonald) in his Pacific campaign as commander of the Chilean navy. In 1853 he was appointed Chilean minister to France. He died Sept. 5, 1876, at Santiago de Chile.

**Encarnacion.** Department of S.E. Paraguay. Watered by the Paraná and tributaries, it is one of the most important, fertile, and best cultivated districts of Paraguay, the chief products being fruit. Villa Encarnacion, the capital, stands on the river Paraná, 175 m. by rly. S.E. of Asunción. Its harbour is the port of five lines navigating the Paraná. Pop. 12,500.

**Encaustic** (Gr. *enkaustikos*, burnt in). Species of painting with colours and wax, said to have been invented by Polygnotus (5th century B.C.) and much practised by the ancient Egyptians and Greeks. Their technique is not definitely known, but it is surmised that coloured powder was mixed with white wax and kneaded into small cakes. When required metal disks with cuplike indentations were heated and a cake was laid on the palette, a different colour in each depression, and gradually melted. The process was rapid, for the wax, laid on with a brush, cooled quickly and the work had then to be touched again with moderately hot irons, which fused the tints. Encaustic painting has been revived by H. Cros and C. Henry, who adapted Caylus' formula for the blending of the wax and pigments.

**Enceinte** (Fr., circuit, enclosure). Innermost line of continuous earthworks or other fortifications enclosing a fortress, strong point, or locality. The general modern

arrangement is an outer ring of detached fortresses, then a series of prepared defences on favourable positions which permit of a step by step retirement if the outer ring falls, leading up to the enceinte, the last line of resistance. This defence is provided at Metz, Strasbourg, Verdun, and fortifications of similar dates, but conditions of modern warfare render the enceinte of little if any value as a line of resistance. See Castle; Fortification.

**Encephalartos** (Gr. *enkephalos*, in the head; *artos*, bread). Botanical name for the plant producing kaffir bread (*q.v.*). See ill. p. 2416.

**Enchantment** (Lat. *incantare*, to chant a magic formula). Magical spell or incantation by means of which the subject, animate or inanimate, is thought to be brought under the influence of sorcery or witchcraft. See Magic.

**Enchondroma** (Gr. *en*, in; *chondros*, gristle, cartilage). Tumour composed mainly of cartilaginous tissue.

**Encina** OR **ENZINA**, JUAN DE LA (c. 1468-1534). Spanish poet and dramatist. He was born, it is surmised, at the village the name of which he bore, and was educated at Salamanca University. His first plays were acted in 1492, and two years later, when his Representaciones were performed before Ferdinand and Isabella and the court, he was secretary to the duke of Alva. In 1496 his plays, partly autos (*q.v.*) and partly secular, were published, and shortly after he went to Rome, where he became a priest and received an appointment in the pope's chapel. In 1519 he made a pilgrimage to Jerusalem, and published an account of it in 1521. He was made prior of Leon, and died at Salamanca, 1534. As founder of the secular drama he occupies an important position in Spanish literature, and his contemporary popularity was such that six editions of his plays were produced between 1496 and 1516.

**Encke**, JOHANN FRANZ (1791-1865). German astronomer. Born in Hamburg, Sept. 23, 1791, he studied in Göttingen, and in 1817 became director of the Seeberg Observatory near Gotha. In 1825 he succeeded to the post of astronomer of the Academy of Science, and director of the Berlin Observatory, then in course of erection. In 1863 he retired into private life at Spandau, where he died, Aug. 26, 1865. Encke worked out, from the observations of the transits of Venus of 1761 and 1769, the first authentic value of the sun's parallax; determined the path of Pons' Comet; and undertook the observation of another comet, since known as Encke's Comet.

**Encke's Comet.** On Nov. 26, 1818, Pons of Marseilles discovered an inconspicuous comet whose elements Encke calculated with the unexpected result of finding that it revolved about the sun in a period of  $3\frac{1}{4}$  years (1,208 days). The period is considerably shorter than that of any other known comet. Its outward journey takes it round the planet Jupiter, to whose family it belongs. Its great point of interest is the irregularity of its movements. For some six or seven successive appearances it will appear according to its time table, then it will suddenly appear before it is expected; and yet again will resume its normal periodicity. The irregularity of its movements has given rise to the speculation that there may be in the solar system some very attenuated resisting medium which retards its movements, and so shortens its orbit. See Comet.

**Enclave** (Lat. *in*, in; *clavis*, key). Detached part of a country or state entirely surrounded by the territories of another. The name is used by the country owning the surrounding land, the separated tract being an exclave from the point of view of the country possessing it.

**Enclosures.** Word which is used specially for common land which is enclosed, i.e. converted by private persons to their own use. This began in England with the decay of the manorial system, when the lords of the manor frequently enclosed common land. From time to time there was an outcry against it, this being specially so in Tudor times. Latimer referred scathingly to enclosures, while Somerset, acting for Edward VI, appointed a commission to inquire into the matter. The law about it during the Middle Ages was contained in the statute of Merton of 1235, which allowed the lords to enclose land, provided that they left sufficient common unenclosed to meet the rights of the commoners.

About 1700 there was a change. Enclosures continued, but they were done by special Acts of Parliament, each dealing with a special enclosure, and these distributed the land between the lord of the manor and the various persons who had rights in it. Between 1700 and 1845 there were about 4,000 of these Acts, under which about 5,000,000 acres of land were enclosed. In 1801 an Act said that the consent of three-fourths of the freeholders and copyholders of the manor was necessary before land could be enclosed. In 1845 the matter was put in the hands of enclosure commissioners whose business was to

examine suggested enclosures, and see that some part of the land was set aside for public purposes. About then the movement for the preservation of common land began. Suggested enclosures, the case of Epping Forest being the standing example, were prevented, and in 1876 an Act virtually put an end to the practice. In Scotland and Ireland the matter never attained the importance it did in England. See Commons; Manor.

**Encore.** Exclamation by listeners to music or play, signifying desire for a repetition. The word is a French adverb, meaning again, but is also used as a substantive, an encore; and as a verb, to encore. It was employed in Great Britain as early as the beginning of the 18th century.

**Encounter Bay.** Inlet of the coast of S. Australia, between Port Elliot on the N. and Jaffa Cape on the S. It is 90 m. across its entrance and is the last important indentation of the coast before the state of Victoria. Off the N.W. corner of the bay lies Kangaroo Island.

**Encratites** (Gr. *enkratēs*, self-controlling). Ascetic sect of the 2nd century. They taught the essential evil of matter and abstained from flesh, wine, property, and marriage. Encratite doctrines seem to have been first taught systematically by Saturninus early in the 2nd century, although the principle was combated already in I Timothy iv, and the sect became organised under the leadership of Tatian. Encratism spread widely in Asia Minor, and the apocryphal Gospel according to the Egyptians furnished some of its arguments. In the 4th century they became merged with Gnosticism and Montanism.

**Encrinetes.** Popular name for the crinoidea (*q.v.*).

**Encyclical** (Gr. *enkyklios*, circular). Eccles. term for a letter from a Church authority, not addressed to any particular individual or community. Thus the General Epistles of S. Peter and the pronouncements of councils which were sent forth to the Church at large were thus named. The term is now used for a communication of the Pope to the bishops generally on some ecclesiastical topic. It differs from a bull, since it does not deal with any special case, but indicates general principles to guide the bishops in dealing with important questions.

**Encyclopedia.** Word derived from the Greek (*enkyklios*, circular, complete; *paideia*, education), which may be translated as the whole circle of knowledge. For many centuries it expressed this idea to scholars trained in the tra-

ditions of Rome, but it was not used as the title of a book until the 16th century, some years after the invention of printing. Before then, however, many works had been written which may be fairly described as encyclopedias, for their authors claimed to give information in them about all the interests of the human mind.

The first of these known encyclopedias is the *Historia Naturalis* of the elder Pliny; and the Middle Ages saw the production of Etymologies by Isidore, bishop of Seville (d. 636); and of *The Origin of Sciences* by the Arab scholar, Alfarabi (d. 950); as well as of a number of less notable ones. The most outstanding encyclopedia, however, written in Latin, was by Vincent of Beauvais (d. c. 1264). It was called *Speculum Majus* (Greater Mirror), and is divided into four main parts, dealing with science, theology, history, and morality (the last section being possibly wrongly ascribed to Vincent).

The material in these encyclopedias was arranged according to subjects, not in alphabetical order, but some time after the invention of printing the advantages of the latter arrangement became manifest. About the same time, too, it was realized that if encyclopedias were to be read they must be written, not in Latin, but in a popular language. However, before these important changes came about J. H. Alsted, in 1620, had produced a Latin work of the old kind, notable because it was the first of any size to be called an encyclopedia. The two innovations just mentioned were both introduced to the world by a Frenchman, Louis Moréri. His *Grand Dictionnaire*, 1674, was an encyclopedia in the modern sense, although, like his immediate successors, he preferred to call it a dictionary. It was very popular, and so was that of Pierre Bayle, which in 1697 appeared as an improvement on Moréri.

The first encyclopedia written in English was the *Lexicon Technicum*, 1704, of the Rev. John Harris, though as early as 1398 John Trevisa had translated a Latin work of this kind into English. Harris was followed by a much greater name in the history of encyclopedias, Ephraim Chambers, the real originator of the modern work. In 1728 Chambers produced his *Cyclopædia: or Universal Dictionary of Arts and Sciences*. A little earlier an Italian, M. V. Coronelli, had begun a more ambitious work, but it was never completed. In 1732-54 was published

Zedler's *Great Universal Lexicon*, a German work ed. by J. A. Frankenstein and others, but usually known by its publisher's name.

The effects of Chambers's work were felt in France. It was translated into French, and on it was founded the most celebrated of all encyclopedias, the *Encyclopédie*, which, edited by Diderot and D'Alembert, counted Voltaire and Rousseau among its contributors. Neither Chambers's nor the *Encyclopédie* included biographies, although Moréri and other earlier writers had done so.

The British counterpart of the *Encyclopédie* was the *Encyclopædia Britannica*. The first edition of this, ed. W. Smellie, appeared in three volumes in 1771. From it biography and history were excluded, but both appeared in the second and subsequent editions. Throughout the 19th century further editions of the *Britannica* appeared, to which the leading scholars of the age contributed. The eleventh edition, issued by the Cambridge University Press, was published in 1910-11.

Meanwhile, a host of other encyclopedias had appeared both in Britain and abroad. In France there was *La Grande Encyclopédie*, also that of Larousse; in Germany the *Konversations-Lexicon* of Brockhaus and that of Meyer; in the U.S.A., the *New International*; and many others. Among the English works of the kind were *The Penny Cyclopædia* of Charles Knight, 1833-43, and the one issued by the Edinburgh firm of Chambers in 1859-68, and several times revised.

At the end of the century a gigantic and novel advertising campaign carried on by *The Times* in order to sell the ninth and tenth editions of the *Britannica* had an enormous effect in popularising the work and in stimulating a demand for books of this kind. This was seen in 1905-6, when *The Amalgamated Press* put upon the market *The Hornsworth Encyclopædia*. Sold in sevenpenny fortnightly parts this was an unprecedented success.

Recent years have witnessed the output of a host of encyclopedias devoted to a single branch of human knowledge—theology, sport, agriculture and education, for example; but the day of the general encyclopedia is by no means over, as was proved when, in Feb. 1920, *The Amalgamated Press* brought out the **UNIVERSAL**.

A. W. Holland

**Encyclopédistes.** Name given to the contributors to the *Encyclopédie* edited by D'Alembert and Diderot. They were writers of high repute in literature and philosophy,

including Rousseau, Grimm, Voltaire, Baron d'Holbach, and the two editors. Several of the encyclopédists held advanced views on political and social matters, besides being sceptics with regard to Christianity, and this was reflected in much that they wrote. The influence thus exerted by the Encyclopédie upon the minds of the educated classes helped to ripen French public opinion in favour of the Revolution.

**End.** In place names, e.g. Audley End, Crouch End, a small suburb, or hamlet. Its older form is endship, and this is used in this sense by Bunyan and Defoe.

**Endecott, JOHN** (1589-1665). English colonial governor. Born at Dorchester, Dorset, he sailed



to N. America in 1628 and became manager of the Naumkeag (now Salem) plantation. Being superseded by John Winthrop, he employed himself in fighting the Indians. In 1641 he was made deputy-governor of Massachusetts and three years later became governor, a post he held with intervals until his death at Boston, March 15, 1665.

**Endemic** (Gr. *endēmos*, native). Term applied to infectious diseases which are always more or less present in certain localities, as distinguished from epidemic diseases which may be widely prevalent at one time and completely absent at another. *See* Disease; Public Health.

**Enderby Land.** Desolate tract of Antarctica. It extends S. from the Antarctic Circle. It was discovered by John Biscoe in 1831, who named it after his employers, Enderby Brothers.

**Endive** (Lat. *intibus*). Plant of the same genus as chicory (q.v.).

**Endocardium** (Gr. *endon*, within; *kardia*, heart). Smooth membrane which lines the interior of the chambers of the heart. Inflammation of this membrane is termed endocarditis. *See* Heart; Rheumatic Fever.

**Endogamy** (Gr. *endon*, within; *gamos*, marriage). Primitive institution binding a man to marry within his own social group only. The best developed example is the Hindu caste, with exogamous clans or gotras. *See* Family; Marriage.

**Endogens** (Gr. *endon*, within; *gen*, to produce). Name formerly applied to the division of flowering plants now known as monocotyledons (q.v.).

**Endolymph** (Gr. *endon*, within; Lat. *lymphā*, water). Anatomical term denoting the fluid which occupies the interior of the membranous labyrinth of the ear of higher animals. *See* Ear.

**Endometritis** (Gr. *endon*, within; *mētra*, womb). Inflammation of the membrane lining the interior of the uterus or womb. *See* Womb.

**Endor.** Village of Palestine, now known as Endur, about 6 m. from Nazareth and close to Mt. Tabor. It was the home of the witch whom Saul consulted.

**Endorsement** or **INDORSEMENT** (Lat. *dorsum*, back). Something written on the back of a document. It is used mainly for the signature which must be put upon the back of a cheque, bill of exchange, etc., when it is passed from one person to another. The endorsement must correspond with the name on the front or it will be irregular. By endorsing the owner of the cheque or bill transfers his rights to another.

**Endosperm** (Gr. *endon*, within; *sperma*, seed). Tissue found in the spores of ferns and their allies and in the seeds of many flowering plants. In the pines (Gymnosperms) the endosperm is formed before the embryo comes into existence; in the flowering plants proper (Angiosperms) embryo and endosperm are formed simultaneously. If a longitudinal section is made of a ripe pine-seed, for example, the embryo will be found to occupy a central cavity, surrounded by a mass of cellular tissue. This is the endosperm, which is gradually absorbed as food by the developing embryo or seedling to tide over the critical period in which it is establishing its roots and expanding its first leaves.

**Endothermic** and **EXOTHERMIC REACTION.** Terms used in physics for the liberation or absorption of heat during chemical changes. It is important to know in any particular chemical reaction what kind of heat phenomena arise and what amount of heat is transferred, as the possibility of a suggested industrial process or its economy may be determined by these considerations.

When heat is absorbed or disappears during the production of a chemical compound, the reaction is said to be endothermic, for heat enters into the new body, and if the new body be subsequently decomposed, heat

will be liberated. The formation of nitro-glycerine is an example of an operation in which heat disappears, to be liberated again should the nitro-glycerine be decomposed, often with great violence. On the other hand, where, in forming a new compound, heat is liberated, the reaction is said to be exothermic, i.e. heat is given out. The reduction of iron in the blast furnace furnishes an example of such reaction.

**Endowment** (Lat. *dos*, a dowry or gift). Gift of money or land to which the idea of permanence is attached. Such indicate the vast amounts that have been given or bequeathed for the support of churches, colleges, schools, hospitals, and charitable institutions of all kinds. In the United Kingdom ancient endowments are under the general control of the state, acting through bodies appointed to supervise them. Such are the Ecclesiastical, or Church Estates Commission that controls the endowments of the Church of England, and the Charity Commission that controls funds left for almshouses, hospitals, and the like. Endowed schools are under the supervision of the board of education. The process of time frequently makes trusts governing old endowments quite out of keeping with the age, and from time to time Parliament has dealt with the matter. Thus the Endowed Schools Acts of 1869-74 removed many abuses and enabled these trusts to be worked in a more modern spirit. *See* University.

**Endurance.** Sir Ernest Shackleton's ship in his second Antarctic expedition. She left England in 1914 just after the Great War had begun, and was crushed in the ice, Oct., 1915. *See* Antarctic Exploration.

**Endymion.** In Greek mythology, a youthful shepherd of great beauty. Of him the moon-goddess Selēnē became enamoured, as he lay asleep on Mt. Latmos in Caria. Selēnē caused him to sleep for ever, so that she might be able to visit him and kiss him every night without his knowing it.



Endymion. Greek statue of the sleeping shepherd, in the British Museum



**Endymion.** Poetic romance in four books of rhymed couplets by John Keats, first published in 1818. A rhapsodical rendering of the classic story of the beautiful youth who inspired love in Cynthia, it is full of poetic riches, both of language and thought. Its opening line, "A thing of beauty is a joy for ever," has become one of the most familiar of quotations.

**Endymion.** Novel by Benjamin Disraeli, earl of Beaconsfield, first published in 1880. It is a presentation of political and social life in England during the middle of the 19th century, opening with the death of Canning and passing lightly through the Reform period. Though the story is slight, the characterisation is brilliant; and the narrative has much of the sparkle and less of the ornateness of Disraeli's earlier novels. Many of the characters were but thinly disguised delineations of actual people of the period, Lord Palmerston, Lady Jersey, and others.

**Enema** (Gr., injection). Fluid preparation for injecting into the rectum. Enemata are used for washing out the rectum in cases of severe or chronic constipation, when they usually consist of soap and water and may amount to one or two pints; for introducing into the bowel substances such as quassia for the purposes of destroying threadworms; and for providing nourishment when acute disease of the stomach prevents feeding in the ordinary way, enemata for this purpose being small in volume and consisting usually of peptonised milk, raw eggs, and meat extracts.

**Enemy** (Lat. *inimicus*). Generally one who is antagonistic or hostile. In time of war, however, it has a special and narrower meaning referring to the state and its subjects with which another state is at war. By the laws of war these are on a very different footing from friends or neutrals. Their persons and property can be seized, and freedom of movement denied to such of them as are on the soil of the country with which they are at war. They become enemy aliens, sharply distinguished from friendly or neutral aliens. See International Law; War.

**Enemy Trading.** Term used generally during the Great War to denote all commercial and economic relations with Germany, Austria, Turkey, and Bulgaria. On Aug. 5, 1914, a royal proclamation was issued relating to trading with the German Empire, and extended to Austria-Hungary, Aug. 12. British firms were not restricted from trading with German or Aus-

trian firms established in neutral or British territory, but only with those in hostile territory. A proclamation of Sept. 9 defined enemy country as the territories of the German Empire and of the dual monarchy of Austria-Hungary, with their colonies and dependencies, and prohibited the payment of money to or for the benefit of an enemy. In the same month certain licences were granted permitting payments, exchange transactions, and payment of fees to obtain the grant or renewal of patents. Later proclamations placed an embargo on the import of enemy-produced sugar (Sept. 30), and the entering into new marine, life, fire, or other policy or contract of insurance (Oct. 8).

In 1915 many additional licences and prohibitions were issued—as the treasury licence (Jan. 8) permitting transactions by certain Turkish banks with their establishments in France, Cyprus, or Egypt, certain regulations as to property, and so on. The Trading with the Enemy (Extension of Powers) Act of this year applied to certain firms in the U.S.A., and the blacklisting of enemy firms in that country led to an American Note of protest. Statutory black lists were also in existence for Holland, Denmark, Spain, Sweden, and other countries.

Late in 1916 the business community of London agitated for the closing of alien enemy banks in Great Britain, and a drastic review of certificates of naturalisation granted since 1904. The board of trade appointed a controller in July, 1918, to wind up the businesses carried on in the United Kingdom by the various German banks, of which the Deutsche was the chief, and these were restricted from carrying on business for five years after the end of the war. With the end of the war many prohibitions were withdrawn, and the black lists ceased to operate.

**Energumen** (Gr. *energoumenos*). Greek word meaning one wrought upon by a spirit, usually evil. It was applied to demoniacs in the early days of Christianity. Persons suffering from mental disease were supposed to be inhabited or controlled by a demon, who could only be expelled by exorcism. See Demonology.

**Energy** (Gr. *energeia*). Capacity to do work. A weight raised above the earth has the power of doing work as it returns to the earth's surface. A body in motion possesses the power of doing work while losing its motion. The energy of a body is measured by the work it can do while changing to some

standard state; or, conversely, the work which has to be done on the body to bring it from some standard state to the state in which it is. In the two examples chosen, the work the weight can do before it reaches the ground, or the work the body can do before it comes to rest, can be measured. The energy is evidently of a different kind. The weight raised above the ground owes its energy to its position. It has *potential energy*. The energy of the body is due to its motion. It has *kinetic energy*.

The weights of a grandfather clock are given potential energy when they are raised, and as they gradually sink they expend it in keeping the wheels of the clock going, in overcoming friction, and in other ways. The mainspring of a watch has potential energy, which was imparted to it when the spring was coiled or wound up, and which it expends as the spring uncoils. In the example of the spring the material of the spring or cord is in a state of strain, and it is owing to this strain that the body possesses potential energy. The potential energy conferred by weight, or the attraction due to gravity, is regarded as due to a strain set up in the ether. If a body of mass  $m$  is moving with a speed  $v$ , its kinetic energy is  $\frac{1}{2} m v^2$ .

**Energy, CONSERVATION OF.** Potential energy and kinetic energy can be changed one into the other, but the total quantity of energy is constant despite the change. When a watch spring runs down, or when a dropped stone comes to rest on the ground, both the kinetic and the potential energy seem to have vanished. But that is not so, because the energy has been converted into heat, which is another form of energy. Joule showed early in the 19th century that a given amount of work (or energy) entirely spent in producing heat always produced the same quantity of heat. From his experiments it is concluded that in every case without exception the sum total of all the energy within any given boundary through which energy is not allowed to pass remains constant, although the energy within the boundary may be transformed into any of the many forms in which it is capable of existing. This is the doctrine or principle of the conservation of energy. Energy is indestructible and uncreatable by man. It exists independently of human senses and human reason, though it is known to man solely by their aid. The discovery of the radio-active elements has thrown a new light on this doctrine. See Radium.

## ENERGY: THE DISSIPATION OF POWER

Sir Oliver J. Lodge, F.R.S., Author of *Man and the Universe*

*This article, following those on Energy and Conservation of Energy, deals with the waste of power, i.e. the loss due to its dissipation throughout the universe, in machinery, and in other ways. Consult also Heat; Physics; Thermodynamics*

Lord Kelvin first noticed and formulated in 1852 "a universal tendency in nature to the dissipation of mechanical energy." The idea is associated with that of different forms or grades of energy, some higher in the scale than others, from the point of view of utility or availability.

Energy is protean in form, and in the physical universe activity is always accompanied by transformation of energy; as soon as all transformation ceases, activity ceases, and torpor sets in. Now some forms of energy are readily controllable, and are transformable into others at will. A rotating flywheel and a raised weight are types of easily transformable energy; either can be made to drive machinery, and so do anything required. In such cases very little energy need be wasted by taking the form of heat, though friction cannot altogether be avoided. An electric current is another useful and tractable form of energy. But some forms are comparatively intractable, such as sound and light and random eddies; the only result that can be shown for such forms, when they have ceased to be, is a modicum of heat.

### Energy and Heat

In every activity contrived by man some portion of energy is always liable to run down into the form of heat. The analogy of water running down hill may be adduced. When taken from a high-level source, water can be employed to drive water-wheels or turbines, but as it descends its working power becomes less, and ultimately, when it reaches the level of the sea, though the quantity of water remains the same, its availability for power is lost.

So when energy has reached the form of heat, not much can be done with it mechanically, unless indeed the body possessing it is at a high temperature. Heat at high temperature can be utilised by engineers, through steam engines, internal-combustion engines, and other devices. To work any form of heat-engine there must be a difference of temperature; one body, acting as source, must be hotter than another, acting as sink; just as in the utilisation of water one reservoir must be at a higher level than another. If all were at dead level, or all at the same temperature, nothing could be done.

But everyone knows that reservoirs tend to leak, and hot bodies tend to cool, without doing any work at all; in other words, speaking thermally, useful inequalities of temperature tend to become obliterated by the ordinary processes of radiation and conduction. Hence heat is considered the lowest form of energy. The proportion of heat that can be utilised by a perfect engine, working between given limits of temperature, depends directly on the difference of temperature and inversely on how far the higher of the two temperatures is above absolute zero.

### Laws of Thermodynamics

This, in mathematical language, is called the second law of thermodynamics, a law which we owe originally to the genius of Sadi Carnot (1796-1832). This law involves in a precise and mathematical manner much that has been popularly expressed above about the dissipation of energy. The conservation of energy, similarly expressed, is called the first law of thermodynamics; a law which, though simple to state, was by no means obvious, and had to be proved, notably by Joule's experiments between 1840 and 1860. The second law, on the other hand, was established by reasoning, and historically preceded the first law.

It may be perceived that in a popular statement of the second law of thermodynamics, or the law of metrical dissipation of energy, such terms as "utility" or "availability" are naturally employed; this tends to show that the law is associated with our present means of utilising the energy of heat. And even when expressed precisely, the terms heat and temperature are essentially employed. Now when we consider what heat and temperature really are, and think of them in terms of the motion of molecules, we perceive that if only the molecules themselves could be harnessed we could extract their energy from them and utilise it, just as we utilise the energy of a driven flywheel. If we possessed such power, the idea of different grades of energy would be superfluous or misleading. But since no means of dealing individually with molecules has as yet been discovered, heat is, to us, a low form of energy; and the tendency of all other forms of energy sooner or later to degenerate into heat, and

for heat to become of uniform temperature, is what is meant by the universal tendency in nature to dissipation of mechanical energy.

It is unwise, however, to base on this law any confident eschatological prediction about the universe, because it is always conceivable that a mode of utilising molecular energy may be discovered, less indirect and statistical than any so far known. People have, in fact, speculated whether some low forms of life may not be already selectively extracting the energy of quick-moving molecules. But for practical purposes, at present, the law of dissipation of energy, as well as the law of conservation, holds sway.

If there is any appearance of contradiction between these two laws it is only superficial, and can be avoided by precision of statement and careful definition of terms, especially by careful definition of the term energy. The irregular motion of a set of molecules, called heat, is as much energy as their regular motion, called wind; but one is easy to utilise, while the other is not. Hence, when wind or water currents run down into generally diffused heat, their energy is not destroyed nor diminished in quantity, but for all useful purposes is dissipated; the case is similar when milk is spilt upon the ground.

### The Problem before Humanity

We live in a stream of continuously dissipating energy, emitted by an exceptionally hot body, the sun. Plants are able to utilise and store some of this, and thus temporarily rescue it from dissipation. Dissipation of the energy so stored in wood or coal ultimately occurs in our homes, furnaces, and factories. Without solar energy everything on earth would be stagnant. The chief problem which faces humanity is to see that the uses to which we put all this beneficent energy are good.

**Enfantin**, BARTHÉLEMY PROSPER (1796-1864). French Socialist. Born in Paris, Feb. 8, 1796, he was educated at the École Polytechnique. In 1825 he met Saint-Simon and adopted his teaching, which he and Bazard disseminated during the next five years. In 1832 he was sentenced to a year's imprisonment for his public advocacy of free love. After a journey to Egypt he was appointed postmaster of Lyons, and in 1845 became a director of the Paris-Lyons Rly. He died at Paris, Aug. 31, 1864. Enfantin's principal works are *Doctrine Saint-Simonienne*, with Amand Bazard, 1830; *Économie Politique*, 1831.

**Enfield.** Urban dist. and market town of Middlesex, England. It is 10½ m. N. of London by the G.N. and G.E. Rlys. The New River intersects the town. The chief buildings are a 16th century palace opposite the church, used by the Constitutional Club, a grammar school founded in 1557, and the parish church of S. Andrew, which contains a beautiful 15th century brass. The Ridgeway is a residential district, and in the neighbourhood are Forty Hall, White Webbs House, and Middleton House. The famous chase of Enfield was disforested in the 18th century. At Enfield Lock is the Royal Small Arms Factory, erected in 1856, where the once celebrated Enfield rifles were made. Pop. 56,338.

Enfield is mentioned in Domesday Book as Enefelde. Edward VI and Queen Elizabeth lived here, and the chase was a favourite hunting ground of James I. It has associa-



Engadine. Village of Samaden in the Upper Engadine, with the Piz Rosatsch on the left

into a freehold. This can be done by mutual consent, or at the instance of the lord of the manor or the tenants thereof. If they cannot agree on the terms, these are settled by the Board of Agriculture.

**Engadine.** Upper portion of the Inn valley, Switzerland, in the canton of Grisons. Divided

**Engagement.** Word meaning originally to bind by a gage or pledge, and used in several senses. It means an undertaking to marry and also a more general kind of pledge—e.g. an engagement to pay a debt or to meet a friend. It is also used as a synonym for a battle; this comes from an old meaning of



Enfield. The market cross and parish church of S. Andrew

Engelberg. The Swiss village at the foot of the Titlis Alp

tions with Keats, Captain Marryat, and Charles Lamb, who lived at Chase Side. During the Great War it was a busy munition centre.

**Enfield Lock.** Lock on the river Lea, Enfield, Middlesex. The name is also applied to the district around it.

**Enfilade** (Fr. *enfiler*, to thread). Military expression which indicates fire along the direction of the enemy's line or trenches—i.e. from a flank. It robs the defenders of an entrenched position of their cover unless the line is very well traversed and few weapons in the line can be brought to bear to counter it. If a unit in action has to change its front it runs grave risks of coming under enfilade fire at once. The advantage of gaining a position on the enemy's flank when attacking is enhanced by the opportunity it gives of subjecting him to enfilade fire. See Artillery; Tactics.

**Enfranchisement** (old Fr. *enfranchir*; *en* and *franc*, free). In English law, a term meaning the turning of an estate of copyhold

into the Upper and Lower Engadine, it stretches 60 m. between two chains of the Rhaetian Alps, and is 1 m. to 1½ m. broad. From Martinsbruck, on the border of Tirol, it runs S.W. up to the Maloja Pass, traversed by a good carriage road, and there are rlys. to S. Moritz and Pontresina. The Upper Engadine has a series of small lakes and is more frequented than the Lower Engadine, which, however, has the attraction of its mineral springs at Schuls. The sides of the surrounding mts. are covered with pine forests to the height of 7,200 ft. The strong, bracing air of the valley renders it an extremely popular health resort. The inhabitants, mostly Protestants, still speak Latin or Romansch, a speech akin to Italian and French.

**Engadine.** British seaplane carrier. She was present with the fleet at Jutland, May 31, 1916, and sent out the seaplanes that scouted for Admiral Jellicoe. Later, she towed the Warrior out of the firing line.

engage, that of joining or fastening, as when, in architecture, two beams are said to engage or interlock.

Historically, the engagement is the agreement signed, Dec. 26, 1647, by Charles I and the Scots represented by the marquess of Hamilton. Charles was a prisoner at Carisbrooke, and he agreed, in return for Scottish assistance in restoring him to the throne, to establish Presbyterianism in England. See Charles I; Civil War.

**Engelberg.** Village of Switzerland, in the canton of Unterwalden. It stands at the N. foot of the Titlis, 14 m. by electric rly. S. of Lucerne. It is a favourite summer and winter tourist resort, with numerous hotels and boarding-houses and an English church. The abbey church is interesting; and the library has 20,000 vols. and 210 MSS. The large Benedictine abbey, founded 1120, was rebuilt in 1729; it has a school and its farm is noted for its cheeses. Engelberg owns common lands, which help to maintain its poor. Pop. 2,434.

**Engels, Friedrich** (1820-95). German socialist writer. Born in Barmen, Prussia, Nov. 28, 1820,



**Friedrich Engels,**  
German Socialist.

he lived in London for the last 25 years of his life and was corresponding secretary of the International Working Men's Association. More generally known as the International, for Italy, Spain, and Belgium, this organization was formed in 1864 with the object of ending war and subordinating capital to labour. Engels was the friend of its moving spirit, Karl Marx, with whom he collaborated in the communist manifesto of 1847. Engels' works include *The Condition of the Working Classes in England*, 1845; Eng. trans. repr. 1920; and *The Origin of the Family, Private Property and The State*, 1884. He died in London, Aug. 5, 1895.

**Engbien, Louis Antoine Henri de Bourbon Condé, Duc d'** (1772-1804). French noble. Born at Chantilly, Aug. 2, 1772, he entered the army in 1788. In 1792 he held a command in the royalist army raised by his grandfather, the Prince de Condé, fighting against the republicans until the peace of Lunéville, 1801. In 1804 he was falsely accused of having taken part in the Cadoudal-Pichegru conspiracy against Napoleon, was seized in the neutral territory of Baden, hurried to Paris, and, after a mock court-martial, was shot at Vincennes, March 21, 1804. The murder of the duc d'Engbien, a crime from which Napoleon vainly tried to exculpate himself in St. Helena, occasioned the famous saying of Fouché: "It was worse than a crime; it was a blunder." See Napoleon; consult also *Correspondance du duc d'Engbien*, etc., ed. Boulay de la Meurthe, 1904-13.

**Engine** (Lat. *ingenium*, skill). Generic name now given to a class of machines for the conversion of one form of energy to another. Formerly a term used for a large variety of mechanical appliances, as beer-engine, water-engine, etc., its present-day usage is confined chiefly to the names of steam-engine, gas-engines, and oil or internal combustion engines.

In the sense of a mechanical contrivance the term engine was used for a warlike appliance, and it was in this connexion that the first engine was ever suggested, by Nye, the mathematician, who in *The Art of Gunnery*, 1647, suggested

the use of water suitably heated as a propelling force for shot instead of powder, followed in 1655 by the marquess of Worcester's description of a steam-engine for raising a column of water a height of 40 ft. The conversion of heat energy into mechanical energy by means of the steam-engine turned inventors' thoughts to the use of other substances besides water, and there appeared the hot-air engine, and in later years the gas-engine, oil-engine, etc. The invention of the internal combustion engine has had an enormous effect upon the progress of the world. See Air engine; Internal combustion engine; Oil engine; Steam engine; also illus. p. 1332.

## ENGINEERING: A GENERAL SURVEY

A. H. Gibson, D.Sc., Prof. of Engineering, University College, Dundee

*This article serves as an introduction to those on engineering subjects, e.g. Breakwater; Bridge; Docks; Harbour, etc. See also Hydraulics; Railways, etc.*

Historically considered, engineering is the earliest of the arts, emerging in the first dawn of civilization when the first tool was made by man.

Little is known as to the earliest development of engineering knowledge. It must have been of a comparatively high order to render possible the construction of the monumental works of Egypt and the East, and the priests of many of the ancient religions probably had an expert knowledge of some branches of mechanics. The aqueducts and bridges built by the Romans, and the remains of metal pumps of the Roman period, show that the principles of civil, mechanical, and hydraulic engineering were well understood before the Christian era.

### The Medieval Engineer

In England the term engineer as defining an occupation appears to have dated from the 13th century. In the wardrobe account of Edward I (1300) occurs a statement of sums paid to engineers for military artificer's work, while in 1344 the army records have a note of the number of engineers borne on the strength of the ordnance. The duty of such engineers was, not only to direct warlike engines and weapons, a duty afterwards delegated to the artillery, but also to undertake the design and construction of fortifications, roads, bridges, machinery, and other works of military service.

About the 12th century public attention in France became directed to the internal communications of the country, and an association was formed under the name of the Frères Pontiers with the main object of building bridges.

**Engineer, THE.** London weekly illustrated paper devoted to the engineering profession. Established Jan. 4, 1856, by Edward Healey, it is the oldest engineering paper in the United Kingdom. For many years the property of the founder, it is now owned by a private limited company, most of the shares in which are held by the Healey family. For a few years *The Engineer* was edited by Zerah Colburn. He was succeeded by Vaughan Pendred, who held the post for about 40 years, and was followed in 1905 by his son, Loughman Pendred. The editorial policy has been consistently to depend upon expert engineers and scientists for contributions.

The association was extended throughout Europe, and built a large number of important works, including the first stone London Bridge. This is perhaps the earliest example of a definite body devoting itself to civil engineering works.

### Early Civil Engineering

The real birth of civil engineering in its modern sense, however, dates from the beginning of the 17th century. At that time the rivers of N. Italy, which had been in use for navigation and regulated for irrigation from early times, appear to have relapsed into a bad state of order, with the result that many disastrous inundations took place. To prevent this, the most learned scientific men of the day were called into consultation, which led to a series of valuable studies and experiments. A class of practitioners was called into existence capable of dealing with hydraulic works and with their necessary mechanical arrangements, and the scope of their work was gradually extended to cover also the design and construction of roads, bridges, docks, workshops, and machinery in general. In view of the fact that the class of work undertaken was analogous to that allotted to the engineers of the military service, the new profession adopted the title of engineer, prefixing the word civil to distinguish its members from their military brethren.

Probably the best definition is that used by the Institution of Civil Engineers which defines engineering as "the art whereby the great sources of power in nature are converted, adapted, and applied to the use and convenience of

man," a definition which covers all the activities of the engineer, whether he call himself civil, mechanical, or electrical.

The development of the steam engine led to an enormous and rapid expansion in the branch of civil engineering devoted to the design and construction of motive-power machinery and mechanical appliances, and to the development of manufacturing processes, and from this period dates the professional term mechanical engineer. Still later, the development of the electric dynamo and of all the electrical appliances and accessories to electric power and lighting, rendered this sub-branch of mechanical engineering sufficiently important to justify the use of the professional title of electrical engineer.

#### Specialised Branches

The more recent rapid developments in all branches of engineering have necessitated further intensive specialisation, and aero engineering, agricultural engineering, chemical engineering, and metallurgical engineering are now to all intents and purposes separate professions. In general the term civil engineering is now confined to the design and construction of such works as roads, bridges, railways, docks, harbours, canals, dams, and coast defences, all of which are essentially of a foundational and stationary character.

The scientific study of engineering principles is of comparatively recent growth. The first engineering school attached to any university in the United Kingdom was founded at Glasgow. This was quickly followed by similar schools at other universities, and a training in the profession can now be obtained at any university or technical institute in the kingdom.

In the domain of mechanical engineering the steam engine has been developed and improved until in its modern form its output of energy per pound of fuel is immensely greater than that of its predecessors. Other forms of prime mover, steam turbines, gas, oil, or petrol engines, have also been developed, until from the point of view of efficiency little further scope for improvement seems possible. Thanks to the reduction in weight found possible by scientific attention to design and by the use of high tensile steels and aluminium alloys developed by the metallurgical engineer, the weight per h.p. of the petrol engine has been cut down to a figure which, only a few years ago, would have been thought fantastic, and the performance of the modern aeroplane has been rendered possible.

In electrical engineering, the development of high-tension overhead transmission lines, by which electrical energy may be transmitted for very long distances comparatively cheaply and efficiently under a pressure of several thousand volts, has rendered it possible to harness many large waterfalls and other sources of water-power remote from any industrial centre, and to transmit this energy, developed by the use of hydraulic turbines coupled to electric generators, to be used at the most convenient site. In the U.S.A. and Canada such transmission lines, some of them exceeding 200 m. in length, have long been in use.

In view of the success of these systems, of the comparative cheapness with which water-power can be developed, and of the rising cost of coal, great interest is being taken in the harnessing of water-power in most countries of the civilized world, and such hydro-electric development promises to provide a most interesting chapter of engineering history. The possibility of utilising very large powers in this way has reacted on the mechanical side of hydraulic engineering. The size of the turbine units has increased by leaps and bounds, culminating, for the present, in the units of 100,000 h.p. each, now under consideration for the Queenston-Chippewa project on the Niagara river.

#### Electro-chemical and other Processes

The possibility of obtaining large blocks of power at the low prices obtaining in many hydro-electric developments has given a great stimulus to electro-chemical and electro-metallurgical processes. Many processes, partly chemical and partly engineering, e.g. the manufacture of aluminium and the production of electrolytic copper, are only commercially possible where electrical energy at a very cheap rate is available. On the European continent much electrical energy derived from water-power is also being used for the production of artificial fertilisers from the nitrogen of the air.

In view of the rapid depletion of the world's natural nitrate deposits, and of the diminution in fertility of most of the great wheat and cotton growing areas, the production of such artificial fertilisers must become a question of world-wide importance. Among other important developments in electrical engineering may be mentioned electric lighting by the arc and incandescent lamp, electric traction as applied to tramways and, more recently, to suburban

and main railway lines, and wireless telegraphy and telephony.

The developments in civil engineering have been probably less marked than in any other branch. Methods of construction have been in general improved and rendered more efficient by the extended use of labour-saving machinery; the design of masonry structures and of steel bridges has been put on to a more satisfactory footing, and the necessity for road surfaces capable of withstanding the wear and tear of high-speed motor traffic has led to advances in the art of road construction. The introduction of ferro-concrete, with its combination of steel bars embedded in concrete to increase its tensile strength, has given rise to a distinctive type of construction which for such structures as bridges, retaining walls, and large buildings often offers many advantages in the way of cheapness of construction and maintenance over the older type of masonry or steel structure.

#### Training of the Engineer

This brief review indicates to what an extent the material prosperity of mankind depends on the work of the engineer. Its means of communication, transport, and locomotion, whether by land, water, or air; its energy supplies; its water supplies and drainage, are dependent on his activities. Indeed, civilization in the modern sense of the word and engineering may be said to be synonymous. While the enormous range of the subject renders it imperative for the engineer to specialise in some one branch of his profession, the training of the young engineer should be on as broad lines as possible, and the wider his grasp of the outlines of all its branches, the better are his prospects of ultimate success. The professional training should include a three years' course in the engineering school of some university or technical institute. The first two years of this course are common to all branches of engineering, and usually include the study of chemistry, physics, and mathematics, and the elementary study of civil and mechanical engineering construction, strength of materials, heat engines, hydraulics, mechanics, along with design work in the drawing-office.

The third year is usually devoted to a more advanced treatment of the subjects relating to some special branch of engineering, and this theoretical training should be followed by a course of practical work in the appropriate workshops or engineering office. It is in some respects an advantage for the



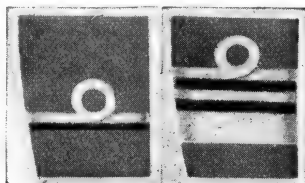
practical training to be taken, whether wholly or in part, before the university course, while in some universities provision is made for a "sandwich" course, in which the engineer takes his workshop training during the summer months of each year, and his theoretical training during the six winter months.

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**Engineering.** London illustrated weekly journal devoted to all branches of the engineer's work, and giving full attention to the theoretical, practical, and economic sides. It was founded in 1866 by Zerah Colburn, the editorship passing early in 1870 to William H. Maw, M.Inst.C.E., and James Dredge. On the death of Mr. Dredge in 1906, B. A. Raworth, who had for many years acted as assistant editor, was appointed joint editor with W. H. Maw, a position he occupied until his death in 1919. He was succeeded as joint editor by Alex. Richardson, M.P. The volumes of *Engineering* contain a valuable record of developments in the construction of steam and other prime movers, as well as in the manufacture and treatment of steel and other products employed by the engineer.

**Engineer Officer.** Commissioned officer of the British navy. He is a technical specialist, responsible for the running of all main and subsidiary machinery in a warship and the control of the engineering workshops and repairs aboard. In the smaller vessels he frequently also performs the duties of accountant officer. Since 1903 engineer officers have been trained as executive officers and are competent to take executive duties and rise to the highest ranks in the navy. They enter training like other naval cadets, pass through Osborne and Dartmouth, where the general course includes engineering, spend eight months on a training cruiser and qualify as midshipmen. Having been commissioned and spent one to three years in the ranks of sub-lieutenant and lieutenant, those who volunteer for

specialist branches take a course at the Royal Naval College, Greenwich, and the engineers then take a further course at the engineering school at Keyham, near Devonport. An engineer officer is distinguished



Engineer Officer. Cuff badges of officers in British navy. Left, sub-lieutenant; right, vice-admiral

by wearing strips of purple cloth between the bands of gold lace denoting his rank.

**Engineers, Royal.** Technical corps of the British army, popularly termed the Sappers. The origin of the corps is of considerable antiquity. There was until 1716 a Chief Engineer who was responsible for the care of all engines of war and had headquarters at the Tower of London before 1350. The ordnance department was constituted a separate unit in 1450, but the Engineers were responsible for the guns until 1716, when the Royal Artillery was established.

The corps may be said to have originated in its modern form in the company of military artificers raised by Sir William Green at Gibraltar in 1772, which, during the long siege, distinguished itself in the construction of galleries on the north face of the Rock and by the repair of breaches made by the enemy's fire.

In peace time the corps is organized as field, signal, bridging, survey, fortress, railway, printing, and postal companies and troops—descriptions which indicate the wide activities of the units and which have been continually augmented as science has played a more and more important part in warfare. During the Great War, special companies were added, whose duty it was to investigate and direct the use of poison gas and the measures adopted to counteract it. Meteorological companies were responsible for information regarding the weather which was essential for aviation and valuable in ordinary strategy.

The corps does not take the field as a unit, but sends detached companies to organize the signal and communication services, etc., of

divisions and other units, advise on the construction of trenches, superintend and organize large defence works, entrenchments, mining of enemy positions, and the destruction of communications in a retreat.

During the long periods of trench warfare the Engineers were chiefly employed in tunnelling and mining. At one stage of the war they used the geophone, an instrument for magnifying the sounds of enemy mining. Later they were provided with the seismomicrophone, which transmitted sounds from as many as fifty gallery faces to a central station, which was situated in a place of safety. This saved the many casualties formerly entailed by listening at each face. Also their work included the improvement of the communications, organizing and manning searchlight stations, and the duties previously outlined. In the advance of August to November, 1918, they erected in the battle area 326 steel bridges (the longest having a 180-ft. span), 213 heavy timber bridges capable of carrying loads of 17 to 30 tons, and necessary for tanks, as well as hundreds of lighter bridges suitable for fighting units and first line transport. In addition to serving in France and Flanders, the Engineers were conspicuous by their intrepidity and persistence in the campaigns in Italy, Salonica, Egypt, Gallipoli, Palestine, and Mesopotamia. On the outbreak of the Great War the Corps of Royal Engineers totalled 1,808 officers and 23,521 other ranks. In November, 1918, its strength was 17,711 officers and 322,739 other ranks, its casualties in killed, died, and missing during the war exceeding 1,100 officers and 17,500 other ranks.

A memorial to the services of the Engineers in the Great War and to the fallen is to take the form of (a) an educational scheme for the benefit of all ranks and all branches of the corps as at present constituted; and (b) a monumental memorial in London. The cost of the entire scheme was estimated to be £150,000. Its motto is *Ubique* (Everywhere). See illus. facing p. 614.

**Engineers, SOCIETY OF.** British learned society. Established in 1854, it was incorporated in 1910, when it was amalgamated with the Civil and Mechanical Engineers' Society, dating from 1859. It exists to further the interests of the engineering profession. The society consists of fellows, members, and associates, and its head offices are at 17, Victoria Street, Westminster, S.W. One of the largest of the trade unions was known until 1921 as the Amalgamated Society of Engineers. See Trade Unions.



Royal Engineers badge

# ENGLAND: ITS TOPOGRAPHY, HISTORY, ETC.

A. D. INNES, Author of *A History of England*, B. C. WALLIS, and A. W. HOLLAND

*A description of England from the topographical, the geological, and the climatic point of view, is followed by some account of its industries and communications. Then come sections dealing with its government and its history, the latter being taken down to 1707, from which date it is continued under the heading of United Kingdom. In addition, some thousands of articles describe the counties and towns, rivers and mountains of England, deal with the lives of kings and statesmen, with wars, battles, and political and social movements. The government is described in detail in a series of articles from Parish to Parliament.*

England, originally Angleland or the land of the Angles, covers the larger and southern part of the island of Great Britain, excepting only that western part of it known as Wales. It is bounded by Scotland on the N. and Wales on part of the W.; elsewhere its borders are the North Sea on the E., the English Channel on the S., and the Atlantic Ocean and the Irish Sea on the W.

The area of England is 50,874 sq. m., being nearly two-thirds of Great Britain. It measures 430 m. in extreme length, from the Lizard to Berwick-on-Tweed, and 370 m. in extreme width, from Land's End to Lowestoft. In shape it is an irregular triangle. The coast, especially on the W., is broken with numerous openings, making a total length of 1,800 m. The W. coast is high and rocky, bold cliffs and buttresses of hard rock standing out to sea. On it are three large openings—Solway Firth, Morecambe Bay, and the Bristol Channel, as well as the mouths of the Ribble, the Mersey, and the Dee, which, however, is Welsh on one side. Between England and Wales there is only a county boundary.

## Coast-line and Harbours

The chief headlands are St. Bees Head, Hartland Point, and Land's End. The S. coast combines the peculiarities of both the E. and W. coasts, the two sections being divided by the Isle of Wight. East of it is a coast-line with a low, clay shore, broken here and there by chalk cliffs; W. of it the coast is high and bold. Its chief openings are harbours, several of which are unusually good. They include Portsmouth Harbour, Southampton Water, Weymouth Bay, Tor Bay, Plymouth Sound, Falmouth Harbour, and Mount's Bay. The chief headlands are the Lizard, Start Point, Portland Bill, St. Alban's Head, Selsey Bill, Beachy Head, Dungeness, and the S. Foreland.

The E. coast is regular in outline, broken only by the estuaries of rivers. In places it is high and rocky, but much of it is low and sandy, and along parts of it the sea is encroaching. The principal river mouths are those of the Tyne, the Tees, and the Humber, the Wash, and the Thames. The chief headlands are Flamborough Head, Spurn Head, Lowestoft Ness, the Naze, and the North Foreland.

The N. boundary is formed by the course of the Tweed, the line of the Cheviots, and three streams—Kershope Burn, Liddel Water, and the Sark—falling into the Solway. Its length is just under 100 m.

There are but few islands off the coast of England. The Isle of Man and the Isle of Wight are the largest, but the former is not, strictly speaking, part of England, having its own laws and government. Off Northumberland are the Farne Islands, Lindisfarne or Holy Island, and Coquet Island, but off the E. coast there is nothing else until Foulness Island, off Essex, is reached. Thanet and Sheppey cannot properly be called islands. Off the W. coast are Walney Island, opposite Barrow, and Lundy Island in the Bristol Channel. Off Cornwall is a group, the Scilly Islands.

## The County Divisions

England is divided into forty counties, varying greatly in size. Some of them are further divided for local government and other purposes, while in the three ridings Yorkshire has a more historic division. The counties and their acreage, which includes the sheets of water therein, are as follows. The number after each indicates its relative position as regards size.

County	Area in Acres.
Bedford (37)	302,942
Berkshire (32)	463,834
Buckingham (30)	479,360
Cambridge (25)	553,241
Cheshire (19)	556,370
Cornwall (14)	868,167
Cumberland (11)	973,086
Derby (20)	650,369
Devon (3)	1,671,364
Dorset (23)	625,612
Durham (21)	649,244
Essex (9)	979,532
Gloucester (17)	805,794
Hampshire (7)	1,053,092
Hereford (27)	538,024
Hertford (35)	404,523
Huntingdon (38)	233,085
Kent (10)	975,966
Lancashire (6)	1,061,615
Leicester (28)	532,779
Lincoln (2)	1,705,293
Middlesex (39)	148,701
Monmouth (36)	349,552
Norfolk (4)	1,315,064
Northampton (22)	638,612
Northumberland (5)	1,291,515
Nottingham (26)	540,123
Oxford (31)	479,220
Rutland (40)	97,273
Shropshire (16)	861,500
Somerset (8)	1,032,490
Stafford (18)	741,318
Suffolk (12)	948,269
Surrey (33)	461,829
Sussex (13)	932,409
Warwick (24)	605,275

Westmorland (29)	505,330
Wiltshire (15)	864,101
Worcester (34)	458,352
Yorkshire (1) E.R.	750,214
" N.R.	1,362,285
" W.R.	1,773,529

This table does not include the county of London, formed in 1888 out of the counties of Middlesex, Surrey, and Kent. Its area is 74,816 acres.

**POPULATION.** The population of England, according to the census of 1921, was 35,678,530. Of these, 16,984,087 were males and 18,694,443 were females. The increase since the 1871 census, according to the decennial census figures, was as follows:

Year	Population
1871	21,495,131
1881	24,613,926
1891	27,489,228
1901	30,813,043
1911	34,045,290

Taking England and Wales together, the average pop. per sq. m. had grown from 389 in 1871 to 618 in 1911. The population of England and Wales, when the first census was taken in 1801, was 8,892,536, or 152 to the sq. m.

In the years between 1911 and 1921 there were great movements of population, this being due to the general upheaval caused by the Great War. A full revelation of the extent and nature of these changes can only be seen when the census figures for 1921 are complete.

Each year the registrar-general, with the various vital statistics before him, makes an estimate of the population of the country. He includes Wales with England. For the years 1914-19 they include the civilian population only. They are as follows, the date being June 30 each year:

Year	Population
1914	36,990,684
1915	35,358,896
1916	34,500,000
1917	33,711,000
1918	33,474,700
1919	35,993,000

In 1915, and still more in 1916, 1917, and 1918, the military population was large, something like 4,000,000 at one time, although these did not all come from England. It was considerable in 1919, when the population was returned at just about a million below the 1914 figure. It seems, therefore, fair to assume, on the basis of the registrar-general's figures, that the

population of England in 1920 was about the same as it was in 1914. The losses of the war had been made good, but that was all.

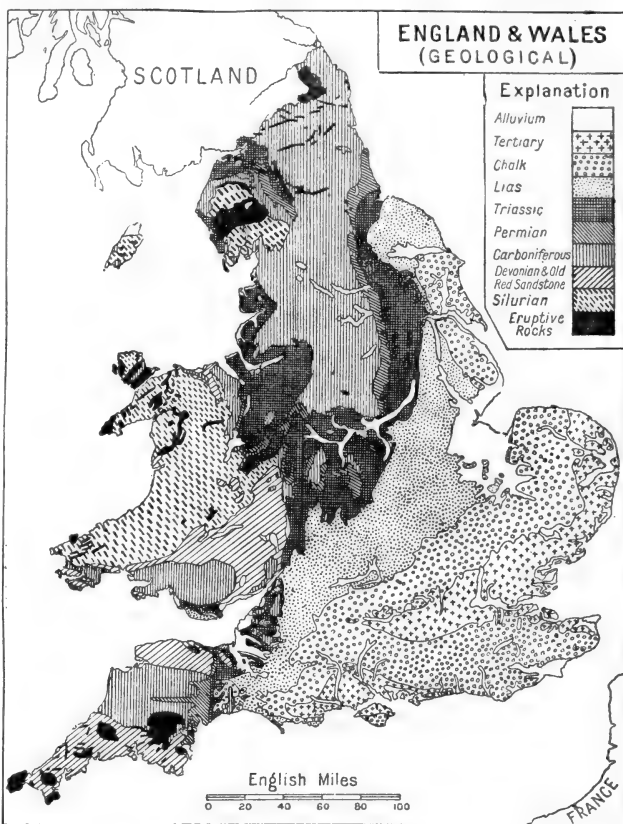
The following table gives, according to the census of 1921, the population of the various counties. It includes that of the county boroughs which are within their areas, although not under the control of the county councils:

Bedford (34) .. .. .	206,478
Berkshire (28) .. .. .	294,807
Buckingham (32) .. .. .	236,209
Cambridge (35) .. .. .	203,372
Cheshire (9) .. .. .	1,025,423
Cornwall (27) .. .. .	320,559
Cumberland (30) .. .. .	273,037
Derby (15) .. .. .	714,539
Devon (16) .. .. .	709,488
Dorset (33) .. .. .	228,258
Durham (3) .. .. .	1,478,506
Essex (4) .. .. .	1,468,341
Gloucester (12) .. .. .	757,668
Hampshire (10) .. .. .	1,005,030
Hereford (37) .. .. .	113,118
Hertford (26) .. .. .	333,236
Huntingdon (39) .. .. .	54,748
Kent (8) .. .. .	1,141,867
Lancashire (1) .. .. .	4,928,359
Leicester (20) .. .. .	494,522
Lincoln (18) .. .. .	602,105
Middlesex (7) .. .. .	1,253,164
Monmouth (22) .. .. .	450,700
Norfolk (19) .. .. .	504,277
Northampton (25) .. .. .	349,384
Northumberland (13) .. .. .	746,138
Nottingham (17) .. .. .	641,134
Oxford (36) .. .. .	189,558
Rutland (40) .. .. .	18,368
Shropshire (31) .. .. .	242,959
Somerset (21) .. .. .	465,682
Stafford (6) .. .. .	1,349,225
Suffolk (24) .. .. .	399,988
Surrey (11) .. .. .	930,377
Sussex (14) .. .. .	728,001
Warwick (5) .. .. .	1,390,092
Westmorland (38) .. .. .	65,740
Wiltshire (9) .. .. .	292,213
Worcester (23) .. .. .	405,876
Yorkshire (2) E.R. .. .. .	544,769
" " N.R. .. .. .	456,312
" " W.R. .. .. .	3,181,654

From this table, too, London is excluded. Its population was 4,483,249.

In 1921 there were in England 42 towns and urban districts with populations estimated as in excess of 100,000. This excludes London. There were in addition a further 52 places with populations in excess of 50,000. The population figures for the largest towns were:

Birmingham .. .. .	919,438
Liverpool .. .. .	803,116
Manchester .. .. .	730,557
Sheffield .. .. .	490,724
Leeds .. .. .	458,320
Bristol .. .. .	377,061
West Ham .. .. .	300,905
Hull .. .. .	287,013
Bradford .. .. .	285,979
Newcastle-on-Tyne .. .. .	274,955
Nottingham .. .. .	262,658
Portsmouth .. .. .	247,343
Stoke-on-Trent .. .. .	240,440
Leicester .. .. .	234,190
Salford .. .. .	234,150
Plymouth .. .. .	209,857
Croydon .. .. .	190,877
Bolton .. .. .	178,678
Willesden .. .. .	165,669
Southampton .. .. .	160,997
Sunderland .. .. .	159,100
Tottenham .. .. .	146,695
Birkenhead .. .. .	145,592
Oldham .. .. .	145,001



England. Map showing the general geological formation of England and Wales

East Ham .. .. .	143,304
Brighton .. .. .	142,427
Middlesbrough .. .. .	131,103
Derby .. .. .	129,836
Leyton .. .. .	128,432
Coventry .. .. .	128,205
Walthamstow .. .. .	127,441
Blackburn .. .. .	126,630
Gateshead .. .. .	124,514
Stockport .. .. .	123,315
Norwich .. .. .	120,653
Preston .. .. .	117,426
South Shields .. .. .	116,667
Huddersfield .. .. .	110,120
Southend-on-Sea .. .. .	106,021
Burnley .. .. .	103,175
St. Helens .. .. .	102,675
Wolverhampton .. .. .	102,373
Blackpool .. .. .	99,640
Halifax .. .. .	99,129
Walsall .. .. .	96,964
Reading .. .. .	92,274

These populous centres fall into three groups: the manufacturing towns on the coalfields of Durham, Lancashire, Yorkshire, and the Midlands; the seaports such as Portsmouth, Plymouth, and Southampton; and the outer suburbs of London, urban districts such as Leyton, Tottenham, Walthamstow, and Willesden, with Brighton put in this category. Norwich is the only large centre outside this classification.

A. W. Holland

**DESCRIPTION.** England is the largest of the four countries which compose the United Kingdom, comprising two-fifths of the total area.

The situation of England with reference to France and the continent of Europe is of supreme importance. The E. and S. coasts make an angle with its vertex just where the British seas are narrowest. Through this S.E. corner continental civilization reached Britain, and through it Britain maintains its closest ties with modern Europe. The English people, as distinct from the Scots, Welsh, and Irish, comprise diverse elements, and similarly the English land consists of rocks representative of many more geological ages than are encountered elsewhere in the British Isles.

**THE GEOLOGICAL FORMATION.** From the modern alluvium of the Wash to the oldest rocks present in Cumberland and Cornwall the geological series is almost complete. England has been gradually built up by successive additions to the older Cumbrian and Cornish lands

as the marine deposits of the several geological ages have permanently emerged from below the sea.

The old western lands occur in three portions. The Lake District is the oldest, with Ordovician and Silurian rocks and large massive or eruptive basalt. The Cornish peninsula and Herefordshire are mainly Old Red Sandstone and Devonian rocks with eruptive granites in Cornwall. Here the rivers have bitten into the rocks and carved the upland into steep-sided, narrow, winding valleys. Between rounded smooth-topped ridges and domes lie marshy alluvial flats, where the streams meander across valley bottoms made by more powerful torrents. In the Lake District the ice sheet gave a slightly different character to the land surface, and in the valleys carved by glaciers long narrow lakes walled by steep slopes radiate from a central knot of mountains.

Between the rivers Tweed and Trent the carboniferous rocks form a chain of uplands which make a definite water-parting between the rivers of the North and the Irish Seas. Flanking the Pennines are the coal measures, which lie in pairs. In the N. the Cumberland and Durham and Northumberland coalfields reach the coast; S. of the range the Lancashire and N. Staffordshire coalfields on the W., and the York, Derby and Nottingham coalfield on the E., lie on the slopes between the watershed and the almost flat plains of Cheshire and the vales of York and Trent.

Farther S. the carboniferous rocks only appear in detached fragments in the midland coalfields between the Trent and the Stratford Avon; in the mountain limestone and the Forest of Dean coalfield on the edge of the Old Red Sandstone of the Wye and Usk.

#### The New Red Sandstone

On the E. margin of the carboniferous rocks, along a line from the mouth of the Tyne to that of the Exe, are detached portions of the Permian system. From Tynemouth to Nottingham both Permian sandstone and magnesian limestone appear in long narrow bands.

Triassic rocks cover a V-shaped area reaching from Middlesbrough to Gloucester, and from Gloucester to the shore of Morecambe Bay. Detached portions fringe the coast of the Lake District, form the valley of the Lower Eden, and extend across the isthmus of the Cornish peninsula. Their best known representative is the New Red Sandstone. Triassic rocks are associated with lowlands, the vale of York, the valley of the Trent, the Cheshire plain, the Fylde of

Lancashire, and the lowlands W. of the Severn.

The remaining portion of England comprises rocks which have no representatives on the W. The Lias stretches in an almost unbroken band from Lyme Regis, E. of the Severn and the Stratford Avon, E. of the Trent, and from Goolle to the coast near the mouth of the Tees. Fringing the Lias along its eastern margin lies the oolitic limestone, which gives rise to a line of residual hills, from the Cotswolds to the N. York moors.

Between the Wash and Dorset a narrow band of Greensand separates the oolite from the chalk which gives rise to a series of hills—the E. Anglian Heights, the Chilterns, the Marlborough, and N. and S. Downs. Within the V-shape of these hills lies the London basin with its young rocks.

The N. and S. Downs are relics of a ridge of chalk which was raised as the Wealden uplift to form a continuous ridge from Wiltshire to France. The middle of the ridge has been worn away to form the Wealden plain and expose the Greensand along the inner scarped edge of the chalk. The Wealden clay within the Greensand, and the Hastings Sand within the clay.

#### Scenic Differences

Each of these geological horizons has been weathered into characteristic land forms. The steep cliff faces of the Millstone Grit in Derbyshire are in striking contrast to the chalk landscape of the downs, marked by rounded contours. The Triassic landscape of the vale of Trent or the Cheshire Plain differs widely from either the oolitic Oxford Clay or the younger London Clay of Herefordshire or Middlesex.

These scenic differences are emphasised by the vegetation typical of each type of rock. The beeches and silver birches of the sandstone of Sherwood Forest differ widely from the woodland which clothes the sides of the narrow Cornish valleys and leaves the uplands bare.

Similarly, the coastal edges of the formations give an infinite variety to the shores of England. The chalk cliffs of Dover and Beachy Head, with their vertical white faces, differ from the sandy cliffs exposed near Bournemouth in the eocene of the Hampshire basin; the miles of iron-bound coast along N. Cornwall from Tintagel southwards are totally different from the sandy lowland shores of the Triassic formation in the Wirral peninsula.

RIVERS AND VALLEYS. Although the highest ground of England is largely due to those foldings of the earth's crust which produced the Pennine and Wealden uplifts, the

residual features are largely the work of rivers. In the N.E., in Northumberland and Durham, the North Sea drainage reaches to a water-parting on the western side of the Pennines; near Cross Fell (2,930 ft.) the Tyne, Wear, and Tees rise close to each other. From Haltwhistle the S. Tyne and the Tyne itself flow due E.; the valley of the S. Tyne leads W. through the Tyne Gap in the Pennines at a lower elevation than 500 ft. to Carlisle. The Coquet, Wansbeck, and Blyth cross the coastal plain of Northumberland, and the Wear and Tees for more than half their length are on the Durham lowland.

#### River Drainage

Between Teessmouth and the Wash almost the whole of the drainage is concentrated on the Humber. The large rivers, except the Yorkshire Derwent, rise towards the W. side of the Pennines, the Trent even on the western slopes, and drop through the dales to the level of the Triassic sandstones and marls in the plains of York and Trent. Richmond, Leyburn, Ripley, Sheffield, Stoke-on-Trent, the first large places on the rivers, mark the termination of Pennine valleys. Lower down stream the rivers flow over the sandstones to the main streams of Trent and Ouse which flow parallel and close to the E. edge of the Trias.

The drainage has hollowed the sandstone into a trough with Lias clays on the E. The Yorkshire Derwent is the one exception to the rule that no long rivers cross the Lias to the Triassic plain. This stream rises close to the coast, flows across the oolitic vale of Pickering between the Cleveland Hills and the Yorkshire wolds in an abnormal course which was determined originally by the presence of sea ice during the ice age in the North Sea. This ice barrier forced the drainage towards the S.W., so that a permanent valley was carved across the Lias clay.

The Wash, Witham, Welland, Nen, and Great Ouse rivers rise on or close to the Lias, and carving out the low residual oolitic hills, drain the trough of clayey land bounded on the E. by the chalk ridge N.E. of the Chilterns. The water gap at the great bend of the Witham is dominated by the city of Lincoln on the oolite ridge above the river.

Probably the Thames once flowed over dry land to join the Rhine and make a great river which flowed N. across the North Sea floor. The Yare, Waveney, Orwell, Stour, Colne, Blackwater,

and Crouch are thus the relics of longer streams which drained from the chalk ridge eastwards to this parent stream. The Kennet rises in the angle where the Chiltern and Downs chalk ridges meet in the Marlborough downs, and flows in a straight course to the Thames at Reading in the general line towards Southend. This is the real lower Thames, with all the left bank tributaries, Colne, Lea, etc., coming down from the chalk across the London clay.

The upper Thames makes a great break through the chalk at the Goring Gap to reach Reading, and the shape of its basin in the Oxford clay plain between the Cotswold oolitic ridge and the Chilterns is due to the general drainage to the S.E. and the sideways drainage in the clay hollow.

#### River System and Market Towns

The Churn, Coln, Leach, Windrush, Evenlode and Cherwell and the Thames itself between Oxford and Reading flow to the S.E.; the Ray and the Thame (vale of Aylesbury), the Ock (White Horse vale), and the Thames above Oxford flow at right angles to this main direction across the clay.

The Wealden rivers rise along a water-parting which roughly follows the line from Hythe to Hindhead. From the northern clay vale the Wey, Mole, Medway and Stour cut through the N. downs. The Arun, Adur, Ouse and Cuckmere cut through the S. downs to the English Channel. The Rother alone is entirely on the Weald, and crosses the Hastings sand.

The Itchen, Test, Avon, Stour and Frome flow from the chalk to the Hampshire basin. The Avon drains Salisbury Plain. All around the coast from the Wash to Poole harbour the rivers reach the sea along a low coast, where the rise and fall of the tides makes a great difference to each estuary.

The river system in general has determined the situation of the market towns. Guildford, Arundel, and Lewes are gap towns on the downs. Oxford, Reading Chelmsford and Norwich have each been influenced by the confluence of two streams.

The peninsular rivers of the S.W. are developed from the Exmoor, Dartmoor, and Bodmin moorlands. The Tamar and Torridge, rising in the Ditchen Hills inland from Hartland Point, are exceptions; the valley of the Tamar makes a lowland way across the peninsula. Falmouth Bay is a typical Cornish estuary. The rivers of the oldest rocks in England are tiny streams which flow into large rock-walled estuaries

which are the drowned valleys of the middle or lower courses of the streams; they indicate a period when the streams were larger, longer, and more powerful, and which preceded the inflow of the sea or the sinking of the coast. The Camel estuary is the only large break in the iron-bound coast of N. Cornwall between St. Ives and Hartland Point; here miles of sand at low water attest the fact that the estuary is too large for the tiny stream which drains into it; the river and estuary are not conformable.

The Parret, Brue, Axe, and Bristol Avon belong to an area where many geological formations are crowded together. The Parret is bounded S. by greensand hills, like Leith Hill in the Weald; the Brue and the Axe belong to Sedgemoor, a fen district in miniature with the limestone Mendip Hills to the N. The scenery of the Mendips repeats that of the Peak district, with lead mines, swallow holes, and caverns. The Cheddar Gorge is, however, without parallel in Derbyshire; the cliffs are probably the sides of a great cave of which the roof has fallen. The Bristol Avon rises in the oolitic Cotswolds, crosses the S. portion of the Oxford clay plain, cuts a gorge through the oolite, crosses a lias clay plain, and cuts a second gorge at Clifton through the carboniferous limestone of the Bristol coalfields to the Bristol Channel.

#### The Severn and Thames

The Severn is a Welsh river of which the middle and lower courses are English. It originated probably as one of a series of streams which flowed in a general S.E. direction from the Cambrian mts. The young stream, in all probability the parent stream of the Thames, flowed across a slope where the surface features were of small magnitude. In time the softer clay rocks of the lias and the oolite were worn away, leaving outstanding sandstone and limestone hills and ridges. Struggles were initiated between the streams and the harder rocks; there was a chance that the Cotswold and Chiltern ridges would cut the young stream into three sections. The Goring Gap was cut through the chalk, but no gorge was made in the oolite, and the young stream grew into two rivers—the Thames and the Severn. On the one hand the Severn is parallel to the Cotswolds and the general lines of the Thame, Thames, and Upper Bristol Avon; on the other, it lies on the lias clay, close to the edge of the Trias, and is related in this respect to the lower Trent.

The vales of Evesham and Berkeley resemble the vales of Newark and York. Above the confluence with the Stratford Avon between Tewkesbury and the Coalbrookdale Gorge at Ironbridge, the Severn valley belongs to the Trias; the Worcester plain is like the plain of Burton on the middle Trent. The Teme, Wye, and Usk may be considered as Severn tributaries. In their English sections they cut valleys in the Old Red Sandstone.

#### Lancashire and Cheshire Estuaries

The Triassic plain of S.E. Lancashire and Cheshire is drained by the Mersey and its affluent the Irwell, the Weaver, and the lower Dee. Their outlets to Lancashire Bay, the Mersey and Dee estuaries, are not conformable with the streams themselves. In both cases the estuaries are being silted up, sandbanks a few feet below the sea continue the Wirral peninsula far to the N., the main channel winding at low water as a narrow stream across the sand-choked Dee estuary. The bottle-neck formation of the Mersey estuary assists the daily scour of the tides, but large dredgers have to be maintained to provide a regular channel for liners. Ribblesdale belongs to the mountain limestone of the Pennines, and connects with Airedale at the Aire Gap.

Lonsdale is a reminder that the Lune is a Pennine stream with a silt-filled estuary. The tiny streams of the Lake District which reach Morecambe Bay are really longer than the map indicates, since they form definite valleys across Morecambe sands and have lower courses which are only obscured at high tide. The Eden rises close to the sources of the Swale and Ure, flows across Permian sandstone to the Triassic Solway Plain; its affluent, the Irthing, completes the Tyne Gap in the Pennines. Like all the Triassic bays, Solway Firth has vast stretches of sand exposed at low tide. The Lake District culminates in Scawfell, but the lake valleys radiate from Helvellyn. Windermere, Conistown Water, Wastwater, Ennerdale Water, Buttermere, Derwent Water, Bassenthwaite, Thirlmere, Ullswater, and Hawes Water are typical lakes of a glaciated area, and fill part of the narrow dales which lead downwards between tree-clad ridges from the central dome where ancient sedimentary rocks are exposed in Skiddaw, and intrusive volcanic rocks raise weathered peaks, as at Scawfell. Walney Island and the coast from Foulney Island to S. Bees Head is Triassic lowland. Windermere, Ambleside and









England. Map indicating the mean actual annual temperature of England and Wales

Keswick are examples of settlements where a route leads from one dale to another.

The shallowness of British seas and the gradual shelving of the English shore are important in reference to the rhythmic pulsations of the tides. In few countries is the tidal effect felt so far up the rivers. In the characteristically English unconformable estuaries the scour of the tides keeps open the regular channels, with the result that there are scores of tidal harbours round the English coasts. No part of England is more than 70 m. from a section of this tide-swept coast.

**CLIMATE AND WEATHER.** Ultimately, the climate depends upon solar insolation and upon the currents in the atmosphere between the lower surface inhabited by man and the isothermal layer about 5 m. or 6 m. up. The lower faces of these currents are disturbed into eddies and whirls by the varied configuration of the land surface, but the general movements are steady and continuous. The climate of England is determined within very wide limits by the intensity of the sun's rays which it receives; because of its situation England is not tropical like Ceylon, nor arid like Egypt, nor a frozen waste like Spitsbergen.

The limits set to its climate by its latitude are very far apart. The precise range of the climate within these extremes is determined by the atmospheric currents, which move in relation to three areas of definite types of atmospheric pressure. To the S.W. over the Atlantic

of the world in corresponding latitudes. These results are chiefly due to the clouds and the consequent rain. The masses of moisture-laden air carried to England from the Atlantic are necessarily cloudy; England has usually a high percentage of cloud-covered sky. The clouds are a blanket in winter and a screen in summer.

In winter when the earth should cool rapidly and dissipate the

clouds restrict the radiation of heat, condense into relatively warm rain, and in so doing release heat and bring muggy, foggy days. In summer the clouds screen England from the fierce rays of a sun high in the sky, and supply frequent rains. As more water is evaporated in summer than in winter frequent rainfall means a lowering of the temperature by the absorption of the heat necessary to change the water into gaseous moisture. An

lies the Azores area of high pressures, to the E. over the mainland the pressure is usually high, to the N.W. over the Atlantic the pressure near Iceland is usually low.

The prevalent surface winds are, therefore, those with a westerly direction which bring oceanic influences to bear, for these winds are usually moisture-laden, warm in winter and cool in summer. The net result is that English seas, rivers, and lakes are never frozen, that England has the mildest winters of any part

English July may therefore be cool and rainy.

The isotherms, which indicate corrected temperatures at sea level, show that in July London in the S.E. is hottest, over 64° F., and that the strip of land along the Scottish border is coolest, below 59° F. But in Jan. Land's End is warmest, over 44° F., and the E. coast from Flamborough Head to the Nore is coldest, below 38° F.; London is no warmer than Carlisle or Berwick, Liverpool is as warm as Southampton.

#### Effect of Winds

The actual weather which is probable at any English town is determined by local conditions of elevation and slope and by general variations from the normal. The prevalent winds usually reach England as cyclonic storms which follow more or less definite tracks from the Atlantic; sometimes the storms are fended away from England because the continental high pressure extends over the S.E. counties and brings clear skies, cool or cold nights with a frosty period in winter; at other times the Azores high pressure approaches the S.W., and Cornwall has bright, sunny days while the N. is cloudy, cool, and wet.

These general variations affect the entire country while the surface configuration introduces purely local variations. The annual temperature of England, were it entirely a plain, would lie between 48° F. and 54° F.; the map shows that it actually lies between 33° F.



England. Map showing the annual distribution of rainfall in England and Wales

and 52° F., and that the hills are cooler than the lowlands. Really the S. coast, the London area, and the lowlands of the S.W. are warmest, the Lake District is coldest, and the Vale of York is as cool as the tops of the N. Downs or the Chilterns. The rainfall map shows primarily the effect of elevation; the wettest place in England is in the Lake District, and even minor ridges are wetter than the plains beneath; the tops of the Downs receive more rain than the Weald plain. But rain clouds come from the ocean, so that the W. of England is wetter than the E. Dartmoor and Bodmin Moor are wetter than the Peak, and the 500 ft. level on the Lancashire slope of the Pennines receives 10 ins. more rain a year than the corresponding level on the Yorkshire slope; Holderness is drier than the Wirral.

The actual number of hours of sunshine experienced in England varies considerably. Cornwall, Norfolk, and the S. coast receive more than 1,500 hours, the E. slopes of the Pennines less than 1,200 hours. But the difference is largely neutralised by the slope of the ground. Although the sun shines almost equally upon both sides of the S. Downs the southern slopes are so tilted that the sun's rays have an increased heating effect, while the northern slopes are, as it were, tilted away from the sun's activity.

The climate and weather of England have, therefore, a definite character. There are no extremes, there is constant change, and, within a small space or a short period, considerable variety.

**MOVEMENTS OF POPULATION.** Celt, Saxon, Dane, and Norman left their impress upon the English people, and the prosperity of England later attracted Welsh, Scots, and Irish from within the British Isles and strangers from the Continent. British freedom drew many immigrant aliens from Central Europe, particularly the Jews. Consequently, the English people is almost as kaleidoscopic as the English rocks or English weather. The total of some 36 millions is unevenly distributed over the area of 51,000 sq. m. England contained two-thirds of the population of the British Isles in 1871 and three-quarters in 1911; the rate of increase per decade has gradually diminished from 134 per thousand, 1861-71, to 105, 1901-1911. In 1801 the population was 8,900,000, and in 1851, 17,900,000.

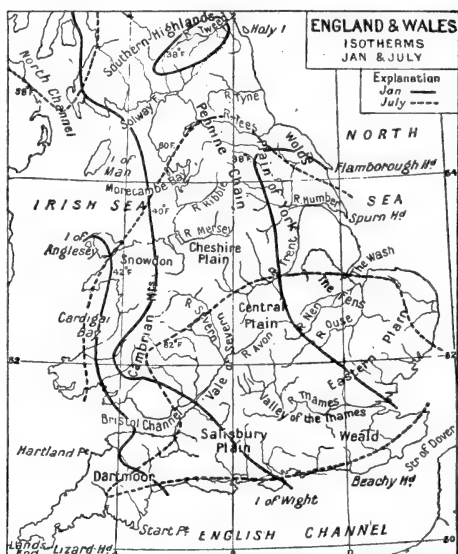
The Pennine, N. Yorkshire and Cornish moors, and the Cumbrian Mts. are uninhabited; in the in-

habited areas there is a continuous gradation towards definite areas of concentration. Roughly, in a belt of country stretching from Weymouth across Salisbury Plain and the Clay Vale to near Peterborough, past Lincoln and Gainsborough to York and the N. half of the plain of the Tees, the population is least dense. E. of this belt there is approximately a steady increase towards the London area. W. of it there are several foci of population. Bristol, the Black Country, the Potteries, the inverted sickle of S.E. Lancashire, and the W. Riding with the continuation to Derby and Nottingham, the Durham district from Darlington to Newcastle—all these are crowded, and the population gradually thins out away from these centres.

#### Varying Areas of Population

A closer examination of details indicates that the areas of dense population such as the London district include nuclei of very dense population grading off to areas of relatively few inhabitants. Consider the area composed of the counties of Cheshire, Derbyshire, Nottingham, and the N. half of Staffordshire. In 1801 more than half the area had fewer people than 128 per sq. m. In the W. half Chester, Nantwich, Northwich, Macclesfield, Stoke, Stockport, and Altrincham were small urban areas with at least 1,920 people per sq. m. In the E., Derby, Nottingham, Newark, Retford, and Chesterfield were similar urban areas. By 1851 the areas of sparse population had grown smaller and the urban areas exceeding 1,920 per sq. m. were more numerous along certain definite lines, from Birkenhead to Stockport along the Mersey, from Stoke N. to Macclesfield, from Derby N. to Chesterfield; the Nottingham nucleus was larger, but those of Chester, Retford, and Newark were unchanged.

By 1901 the areas of sparse population were nearly as large as in 1801; the rural areas were being depopulated. The urban nuclei, already developed in 1851, had be-



England. Isothermic map, in which points recording the same temperature at a given time are joined by lines

come larger except at Newark. New nuclei had grown along the lines already noted, but the greatest change occurred near Nottingham, where a small urban area had expanded to make almost a complete ring something like 5 m. wide. Throughout two-thirds of the area the population was less numerous in 1901 than a century earlier; in parts there had been an almost continuous decline, elsewhere there had been growth until 1841 and subsequent decline. The urban areas already specified had multiplied their numbers by from 4 to 10 times. Near Birkenhead, round Stoke, in a belt of country from Nottingham to Chesterfield, there occurred exceptional growth.

#### General Conclusions

An inquiry into the circumstances attendant upon these changes yielded the following conclusions. The purely farming areas either absolutely declined in numbers or increased by little more than 50 p.c. In the lead-mining districts the population was almost stationary until the mines failed, when it declined absolutely. In the colliery districts the population increased approximately eightfold. In the salt-mining areas of Cheshire the people increased steadily. In the districts where cotton factories were established growth in population was rapid, but the failure of factories established in unsuitable localities during the boom caused a decline. Results may be summarised thus: the industrial development of the area

attracted the people from the farms and also drew to the urban nuclei large numbers from other parts of England. Similar conclusions may be drawn from an investigation concerning the population of the W. Riding; the farming areas tend to decline in population, the purely mining areas increase steadily, the iron-working and textile areas increase rapidly, the latter especially from the advent of female immigrants.

English towns may be divided into 7 groups: 1. The ring of dormitory towns round London: East Ham, West Ham, Wimbledon, Richmond, etc. 2. Factory towns for textiles, pottery, iron goods, etc.: Manchester, Leeds, Bradford, Birmingham, etc. 3. Mining towns: Barnsley, Nuneaton, etc. 4. Transport centres: Crewe, Swindon, Liverpool, Bristol, Hull, etc. 5. Historic market towns: Oxford, Chester, Bath, Canterbury, etc. 6. Playgrounds: Brighton, Scarborough, Blackpool, etc. 7. Towns of specialised industry: Reading, Luton, Bedford, etc.

**INDUSTRIES, TRADE, COMMUNICATION.** England grows 2 p.c. of the world's wheat and oats, 4 p.c. of the barley, and contains 2 p.c. of the world's cattle and horses, and 3 p.c. of the sheep. These products only supply a fraction of the cereals and meat required by the inhabitants, with the result that England is proportionally the greatest food importing country in the world. The wheat is grown chiefly N. of the Thames, and E. of a line drawn from London to Goole. In the U.K., with a small increase in production and a decrease in imports of wheat during the Great War, the proportion of home-grown to the total consumption of wheat increased from 22 to 27 p.c. Oats are spread over the lowlands. The largest county yields are in the E. Riding and Cambridgeshire, but do not equal those of E. Ulster. In Cheshire three-quarters of the arable land is devoted to oats to supply the local needs. Only a small proportion of the oats consumed in England is grown outside the U.K. Barley is grown in the driest E. counties, Norfolk, Suffolk, and Lincoln; the dryness of the harvest improves malting quality, and the warm spring yields specially valuable crops. During the Great War the quantity of barley grown was considerably diminished.

#### Cattle and Dairy Farming

Cattle are most numerous in the W. lowlands, extending from the plains round Morecambe Bay in a wide sweep along the Severn valley into the Cornish peninsula, where the rainfall exceeds 40 ins. an-

nually, and the clays and alluvial flats yield rich meadow grass. A third of the cattle belongs to dairy farmers. The great centres of population have brought into existence many small farmers with small herds of milkers on poor grass-land. The demand of London has produced special rly. facilities for bringing the milk from as far as the Vale of Pewsey, in Wiltshire. In Cheshire the dairymen supply the cotton towns with milk, and make cheese; Derbyshire and Leicestershire produce Stilton cheese. Cornwall is almost purely a cattle county, the milk being made into butter and clotted cream. In Devon the cattle are reared for their milk as in Cornwall, but also for the butcher, being sold to graziers as two-year olds and sent to the Midlands or Hampshire. During the Great War the number of cattle increased by at least 5 p.c.

#### Sheep Runs and Farm Lands

Great Britain contains probably the largest number of sheep in proportion to area of any country. Kent has the most sheep per sq. m., the short pasture and dryness of the chalk hills being specially suitable. Wiltshire, Dorset, Lincolnshire, and the E. Riding are great sheep counties for the same reason. The hill slopes of Shropshire, Hereford, Monmouth, Northumberland, and Cumberland are also important. The number of sheep declined by 16 p.c. during the Great War, in Wiltshire and Hampshire the decline amounting to 30 p.c.

In thousandths of the total area of England the proportions of the various kinds of farm lands are as follow: Mountain and heath used for grazing, 84; permanent grass, 392; oats, 70; wheat, 66; barley, 44; mixed corn and rye, 7; beans and peas, 14; potatoes, 14; turnips, swedes, and mangolds, 40; clover and other rotation grass, 62; bare fallow, 20. The average number of animals per 1,000 acres are respec-

#### PROPORTIONS OF CROPS AND ANIMALS PER 1,000 ACRES

	Permanent grass	Acres			Number	
		Wheat	Oats	Barley	Sheep	Cattle
Essex .. .. .	262	131	72	60	140	100
Devon .. .. .	379	47	95	24	449	189
Cheshire .. .. .	475	45	119	3	151	274
Lincolnshire .. .. .	285	106	79	111	426	152

tively: horses, 38; cattle, 166; sheep, 420; pigs, 50.

A comparison between these average values for England as a whole, and the return for four selected counties, indicates roughly the effect of climate and soil upon the farmer's work.

Essex is dry and near London; Lincolnshire is equally dry, but distant from dense areas of popu-

lation. Devon and Cheshire are wet, and Cheshire is near populous S.E. Lancashire. The minor crops of Essex are beans, peas, potatoes, and other roots; glasshouses supply grapes, tomatoes, etc., to Covent Garden; there are numerous seed and fruit farms: rose culture is important. The cattle supply much milk to London.

Devon has few towns; the wheat yield per acre is one of the lowest in England; apples, pears, plums, etc., are largely grown; Devon cattle fetch high prices and Devonshire cream is celebrated. Cheshire grows considerable quantities of potatoes, and roots for winter feed; damsons are the chief stone fruit; the cattle consist chiefly of dairy cows.

Lincolnshire is definitely a farming county; the acreage under barley roughly equals that under wheat, and exceeds that of any other county; peas, beans, potatoes, and other roots are important crops; Lincoln shorthorns are good milkers and Lincoln sheep are exported for breeding to the S. hemisphere. A large proportion of the cattle are bred for the butcher.

Comparing the tabulated results, it appears that the wetter W. has a relative excess of permanent grass and cattle, the cattle of Cheshire being 60 p.c. above the average. Devon has above the average number of sheep. All four counties exceed the average in oats, but the greater excess is in the wet west. In the drier counties Essex has an exceptional area under wheat and Lincolnshire under barley; the W. has little of either crop. Essex has below the average in both sheep and cattle.

#### Distribution of Coalfields

In estimating the value of mining in the U.K. and in England in relation to the rest of the world, it is necessary to consider the statistics for the period immediately preceding the Great War. The

chief English mineral is coal. A quarter of the world's coal was mined in the U.K., one-fifth in England alone. To get this coal occupied about a million workers, so that about 10 p.c. of the U.K. population was dependent upon the collieries. The distribution of the coalfields depends upon the presence of the carboniferous rocks, but the E. coalfields, in particular



those of York, Derby, and Nottingham, have an indefinite boundary under the newer rocks to the E. of the carboniferous series; thus coal may be found at greater depths on the E. margins.

Britain produced about one-eighth of the world's iron, chiefly on the coalfields, where the ore was found between beds of coal and, in addition, in Cleveland and Furness, where there are large deposits of haematite ore. The demand for iron ore for war purposes led to the increased mining of low-grade ores in the newer strata E. and S.E. of the Trent, and modern methods of iron-mining, combined with high prices, may mean the continued exploitation of these ores.

#### Decline of Lead-mining

Less than one p.c. of the world's lead was mined, chiefly in Derbyshire, but lead-mining has been declining for many years. Cornwall produced less than 4 p.c. of the world's tin, chiefly at the E. Pool and Tresavean mines. Zinc in Cumberland, manganese in Cornwall and Devon, and tungsten in Cornwall are minerals of minor importance. The most important non-metallic mineral is salt, which is chiefly found in the Nantwich district in Cheshire, but also in Lancashire, Worcestershire, and Durham.

The chief English fishing towns are on the E. coast. Grimsby, Yarmouth, and Lowestoft account for most of the catch on this coast, which amounts to more than three-quarters of the English total. Newlyn, near Penzance, is the chief fishing centre on the S. coast, and St. Ives and Fleetwood on the W. coast. The main catch in the N. Sea is herring, in the Channel, mackerel and pilchard.

The most important English manufactures are textiles. Cottons occupy 500,000 workers and are focussed on Manchester; the chief districts are Blackburn, Oldham, Bolton, Stockport, Preston, and Rochdale. Woollens are chiefly made in the W. Riding, with Bradford as a technical and Leeds as a marketing centre, the other chief districts being Huddersfield and Halifax. The manufacture of woollens extends W. to Rochdale, that of cottons E. to Halifax and Bradford. Silk goods are made over a wider area and on a smaller scale, the main centres being Bradford, Stockport, Halifax, Stoke, Birmingham, and London. Leicester, Nottingham, and Derby manufacture lace and both cotton and woollen hosiery. The distribution of the textile industry is largely controlled by the S. Pennine coalfields.



England. Map showing the principal railway systems of England and Wales

Because England took the lead in manufacturing on a large scale, the English manufactures of iron and steel were for a long time more important in rly. construction, and in iron and steel shipbuilding, than those of any other country.

Smelting operations are usually carried out near the mines, especially in Cleveland and the Black Country. Pig iron is made to the extent of nearly 3,000,000 tons annually of each type: forge and foundry, Bessemer, haematite, and basic; for these purposes iron ore is imported chiefly to Middlesbrough to supplement local supplies. Steel is made chiefly by the open hearth process; the Bessemer process yielding only a fifth of the total; during the decade 1910-20 many electric furnaces were established for special steels. Sheffield steel and Birmingham hardware are famous all over the world.

The chief shipbuilding district extends from the Tees to the Tyne. The Great War led to a rapid expansion of the iron industry; numerous factories were extended or newly built, and it remains to be seen whether they will survive.

The great centres, Sheffield, the Black Country, the N.E., and Barrow-in-Furness lie on coal or iron fields, although the newer factories are more widespread. Metal factories and workshops for zinc, copper, aluminium, and tin goods are associated with the iron works, but are also developed, e.g. the metal parts of motor-cars, in the large urban centres such as London and Manchester. Wolverhampton is an important metal centre.

#### Localised Manufactures

Certain manufactures are specifically localised. The Potteries on the N. Staffordshire coalfield use local clay and coal for making crockery and earthenware, coal purchase being the main factory expenditure. Northampton and Leicester are the main centres for boot and shoe manufacture. Walsall specialises in harness and saddlery. Chemicals, alkali, and soaps are made chiefly near the Mersey in close relation to the Cheshire salt for raw material and the textile works for consumption of part of the finished products. Steam-driven flour mills have superseded water mills and are located at the wheat-importing ports, London, Hull, etc.

The main English rlys. radiate from London. The L. & Y. and the N. Staffordshire Rlys. are the two principal lines not based upon London. The L.N.E. Rly. forms an integral part of the E. coast route from London to Scotland. The lure of London traffic caused the Manchester, Sheffield, and Lincolnshire Rly. to become the Great Central Rly., with a London terminus at Marylebone. Although London has profoundly influenced the railway system, it has not overwhelmed provincial traffic even outside the textile area of Lancashire and Yorkshire, for the ports of Bristol and Southampton are well served, especially from the Midlands. A new grouping system came into force in 1923. (See Railways.)

#### Canals and Roads

During the later 19th century the several rly. companies competed vigorously for traffic, but later the stringent economy in rolling-stock and personnel added to the ever-mounting cost per passenger- or per ton-mile. The gradual electrification of the rly. service is of great importance.

English barge canals have been subordinated, by rly. competition, mainly to the slow carriage at low cost of heavy, bulky, and non-perishable commodities. The canal map shows roughly four main canal routes radiating from the Midlands to the Mersey, Humber, Thames, and Severn estuaries. These routes, at present, suffer from differences of section, i.e. width and depth of water, which limit the carrying capacity of "through" boats.

The only ship canal of importance has made Manchester a port and has brought ocean steamers some 30 m. inland, almost to the doors of the cotton factories.

The main roads, roughly a dozen, radiate from London to all points of the compass; but Leeds, Manchester, Chester, Birmingham, and Gloucester are also road centres. There are two great routes which do not touch London; from Sheffield through Birmingham, Gloucester, Bristol, and Exeter to Land's End, and from Chester through Shrewsbury and Hereford to Gloucester. The minor hills do not affect the roads, but the Pennines are only crossed by four main roads, through the Tyne and Aire Gaps, over Blackstone Edge to Manchester, and by Buxton from Manchester to Derby. Road development will, however, follow the demand for improved surfaces, wider and straighter roads, and better cross connexions between one and another.

The exchange of commodities within England and between England and other portions of the U.K. constitutes the home trade. The geological division of the country into an area of new rocks in the S.E. separated by the oolite ridges from the older rocks of the W. and N. corresponds roughly to a division into an agricultural S.E. and an industrial Midlands and N., and has definitely localised many occupations. The specialised local products are interchanged; London coal is brought by rly. to the area N. of the Thames, and by sea for that S. of the river; the textiles warehoused and retailed in the metropolis are brought by train from Lancashire and Yorkshire; jams, metal products, luxury commodities of all kinds are distributed from London.

Burton beer, Stoke crockery, Northampton boots, Leeds ready-made clothing, Yarmouth fish, Scilly Isles flowers, Reading biscuits, Bristol tobacco, Nottingham curtains, are a few articles of home trade. Welsh mutton, Irish butter, Scottish oatmeal, Belfast and Dundee linens, Swansea tinplate, Isle of Man fish, Channel Islands potatoes and tomatoes increase its total volume. In addition to long-distance trade each urban centre is a market attracting a considerable traffic in foodstuffs.

#### The Market of the World

England is probably the greatest market in the world. The world-price of wheat, for example, is affected by the price which imported wheat fetches in England. The desire to supply England has brought about cold storage for mutton and beef, perishable fruits, etc., and has caused great developments in canning, drying, or preserving foodstuffs. Wheat is harvested, and fruits are picked somewhere in the world every week, and consequently the world can send to England a continuous stream of foodstuffs; the products of the S. hemisphere, wheat, mutton, beef, butter, fruits, etc., are at their best when the supplies of the N. begin to fail. In addition to these supplements to home supplies, tea, coffee, rice, etc., are imported.

But England is a market for raw materials as well as foodstuffs. The prices of raw cotton and raw wool are affected by the English demand. Iron ore in distant parts of the world could be mined cheaply if it could be utilised locally, but it is undisturbed because the price in the English market will not yield a profit after freights and mining expenses are met. Copper, tin, lead, zinc, manganese, either smelted or

as ores, are all largely imported. England also obtains large quantities of semi-manufactured articles, chiefly for textile and metal trades.

Finally, England buys the specialities of other lands: Parisian finery, American motor-cars, and, before the war, German pianos, chemicals, etc. England pays for these imports by the services of the merchant shipping, of the technical experts lent to other lands, and by the export of coal and English manufactures. English textiles are sent over the whole world, English machinery and metal goods cover almost as wide an area. Except for the coal most of the exports represent English labour much more than English material. On a broad view, therefore, England's overseas trade consists in the receipt of food supplies which are paid for almost entirely by the sale to the rest of the world of English technical skill, i.e. human labour exerted through machinery.

#### Seaports of England

London and Liverpool rank among the greatest seaports of the world. They are approximately equal in total value of trade in normal times, but London has an excess of imports, in the ratio of 2 to 1, over exports, while at Liverpool exports and imports balance. They are each responsible for a third of the overseas trade of England. Hull, Manchester, and Southampton are the chief of the smaller ports; their imports exceed their exports. Grimsby, Newcastle, and Goole have exports and imports to balance. Bristol, Harwich, Newhaven, Dover, and Folkestone are characterised by an overwhelming excess, about four times as valuable, of imports.

The above facts refer to pre-war conditions. During that critical period Harwich, Dover, Newhaven, and, to some extent, Southampton, were closed, and Falmouth rose to considerable importance by being used to a large extent instead of London. Similarly Newcastle was used in preference to Hull.

B. C. Wallis

**CONSTITUTION AND GOVERNMENT.** The system of government which for centuries served to regulate the affairs of England has been extended to deal with those of the other three parts of the United Kingdom, and to some extent with those of the British possessions throughout the world. The result is a system unsound theoretically, bewildering and confused historically, but from the practical point of view workable, and on the whole satisfactory. Fortunately there is one fixed point amid the confusion—the British monarchy.

The official who by a series of events added to his duties and powers as king of England those of ruler of Ireland, Wales, and Scotland, and then of vast territories in America, Asia, Africa, and Australia, had before these events his ministers, his parliament, and his court. As his duties expanded so too did theirs, although in an unequal and illogical manner. His chancellor became the lord chancellor for Wales and Scotland, but not for Ireland; his secretaries took over certain duties in the other countries, but by no means all, nor on any consistent plan. The result is a ministry in origin that of England alone, but composed of ministers exercising varying degrees of power over the rest of the United Kingdom.

Parliament, too, has extended the area of its duties. It has been transformed, with very little structural alteration, into one representing the four countries of the United Kingdom, and controlling, in addition, the affairs of the British Empire. Here, however, there are neither limitations nor exceptions. Parliament has exactly the same power over Ireland and Scotland as it has over England; theoretically, at least, it has equal authority over Canada, Australia, and the rest of the Empire.

#### How the Democracy Works

England, classed from the point of view of government, is a democracy, perhaps the most complete the world has ever known, and the democracy exercises its power through the representative system. Since 1918 the vote has been possessed by practically all adult males and females, and by them the members of the House of Commons are elected. Every possible device, trickery, and even deception may be used to influence their choice, but the fact remains that they are free to send to Parliament man or woman, whomsoever they will.

The democracy, however, works through certain traditional and historical forms. It has secured the supreme power in the state without making any violent changes in the constitution. The state has a figure-head in the person of an hereditary monarch, while, part of the high court of Parliament, there is a House of Lords, in which again the hereditary element prevails. The House of Commons, too, employs very much the same methods as it did a century or two ago. Democracy in England has found less violent ways of securing its omnipotence than by beheadings and bloodshed. It has made the House of Commons its instrument of action, by transforming it

into the dominant factor in the constitution.

**THE LEGISLATURE.** The constitution of England may be considered under three heads: the legislature, the executive, and the judiciary, three departments with entirely different functions. Of these, the legislature is supreme. It consists of king, lords, and commons, or the king in Parliament, and the laws are made, theoretically at least, by the three together. This untrammelled law-making power is the reason why the legislature is supreme. Everything else flows from it. All that is necessary to abolish the House of Lords, to sell off the navy, to make the income tax 20/- in the £, is a law passed by Parliament.

#### Legislature and the Commons

It is hardly true, however, when we come to actual facts, to speak in the 20th century of legislation by king, lords, and commons, while it is little more than a pleasing ceremonial that requires the assent of the king to Acts of Parliament. In practice the legislature is the House of Commons. It has two partners in the matter, it is true, but they have no power whatever to stop any measure which the Commons are determined shall become law.

To the House of Commons England returns a clear majority of members. Of a total of 707, no less than 492 are returned by English constituencies: 230 by the counties, 255 by the boroughs, and 7 by the universities. There is also a majority of Englishmen in the House of Lords.

The House of Commons is the supreme organized body in the state. By degrees, curbing the powers of the king and of the House of Lords, it has attained that position, the final touch being given to this process by the Parliament Act of 1911. The king's veto has passed into disuse, while that of the House of Lords is only a suspensory one for a short period of time. It is true to say that the House of Commons alone possesses the law-making power, and there is no possible way of questioning the laws it makes, save by violence; judges cannot, as they can in the U.S.A., be called upon to pronounce upon their validity; they can only interpret their meaning. However absurd a measure is, however unpractical, if the House of Commons wishes it and is prepared to push it through the necessary stages, it becomes the law of the land quite as much as Magna Carta. The house can even, as it did in 1715 and in 1915, prolong its own existence.

**THE EXECUTIVE.** The House of Commons cannot, by its very size and constitution, do more than legislate and exercise a general supervision over affairs of state, and it is that fact which is the real check on its own omnipotence. It is frequently faced with the dilemma of suffering a violation of its wishes or parting with a minister who may in many ways suit it well, while its zeal is tempered by the reflection that its master, the electorate, might possibly, if asked, endorse the action of the offender.

At the head of the executive is the prime minister, the most powerful man in the state, and one whose powers have increased vastly since about 1900. Originally a minister of the king of England, he is now the prime minister of the whole country, and in a sense of the whole empire. Acting with, or rather under him, are other ministers, the most important of whom form the Cabinet. These Cabinet ministers are bound together by a common set of principles, this being especially so when they belong to a single political party, but it is also true of a coalition, even if it is only the common principle of forgetting them. The modern tendency, however, is rather for the decisive bond to be the common enjoyment of the prime minister's confidence.

#### Powers of the Cabinet

The powers of the Cabinet can hardly be defined, so much depends upon the personality of its members, but they are considerable. It has a marked influence on legislation because, without its support, a proposal for a new law has little chance of success. In practice the Cabinet initiates legislation. It is the creature of the House of Commons, and is never unmindful of its creator's will if such is emphatically expressed, but in the dealings of the one with the other the Cabinet has the inestimable advantage of being a small body animated by a common purpose against a large one in which the common purpose is rarely present.

The ministers are in charge of the various departments of state, being responsible for their working in Parliament. The outward sign of this responsibility is their presence in one or other of the Houses of Parliament in order to answer questions, or to defend, if need be, the actions of the departments over which they preside. The departments are manned by civil servants, permanent officials who stay in office and carry on its everyday work, while ministers come and go.

Apart from the executive, but equally under the control of Parlia-

ment, is the judiciary. At its head is the lord chancellor, who presides over the House of Lords, which is the supreme court of law, save for certain classes of cases in which the judicial committee of the privy council serves that purpose. For England and Wales there is a supreme court of judicature, from which appeals lie to the House of Lords. This consists of two branches, a court of appeal and a high court of justice. The latter is further divided into chancery, king's bench, and probate, divorce and admiralty divisions, while special branches, *e.g.* bankruptcy, have been established. The judges of the king's bench go round the country on circuit, there being for England and Wales eight circuits, and in each a number of assize towns. London is outside the circuit system, and for it there is a central criminal court.

Justice is administered locally by recorders and magistrates, who sit in quarter and petty sessions. They deal with minor cases, sending those of a more serious character to the judges at the assizes. County courts all over the country deal with civil cases involving less than a certain amount of money.

**LOCAL GOVERNMENT.** Under the supreme control of Parliament, the people of England enjoy a large measure of local government. Here again each unit is a democracy working through the representative system. The men and women of county, borough, district, and parish elect certain men and women to form a council which manages such matters as Parliament has entrusted to it. In many, but not all, of these councils there is an element not directly elected, the aldermen.

#### The County and the Borough

The main division, as far as local government areas are concerned, is the venerable one between county and borough, although the demarcation is by no means complete. The forty counties of England have had some sort of local government for a thousand years, but the existing system only dates from the Local Government Act of 1888. The officials who until that time governed the counties, lord-lieutenant, high sheriff, and magistrates in quarter sessions, retain their positions, but not their powers, which passed in 1888 almost entirely to elected bodies called county councils.

The county councils set up in 1888 do not correspond altogether to the counties as they existed before that date. For the forty old or geographical counties, as they are called, fifty county councils

were set up and there are, consequently, fifty new or administrative counties. Most of the old counties were simply given county councils without serious change of boundary, but a number were divided to make fresh counties. The additional ten were found by making the three historic divisions of Yorkshire and the three of Lincolnshire into counties, each with a council, by dividing the five counties of Cambridgeshire, Hampshire, Northamptonshire, Suffolk, and Sussex into two each, and by creating a new county of London from parts of Surrey, Middlesex, and Kent.

#### The County Boroughs

The county councils hold elections every third year, and their powers over education, police, public health, and other matters are laid down in the Acts of 1888 and following years. Towards their expenses they receive large sums from the government, but the balance they raise by a rate on all property within the county. There is no limit to the amount they can thus raise, but their accounts are supervised by the ministry of health. They can, under certain conditions, borrow money.

The Act of 1888 affected also the boroughs. It created a class of boroughs called county boroughs, placing them entirely outside the authority of the county councils, and thus established a system by which every place is in a county, either county proper or county borough, and consequently every voter is represented in one or the other of the councils. A county borough must have a population of at least 50,000, and it is a recognized practice that as soon as a borough attains that size it is made a county borough by order of the ministry of health. There are about 70 of these county boroughs, but the number is being steadily increased. They have exactly the same powers as the county councils received under the Act of 1888, together with any others they may possess under Acts regulating the affairs of the boroughs.

We come now to areas and councils which are subordinate to the county councils. Excluding the county boroughs, every part of England is either a borough, an urban, or a rural district, and every one of these is part of an administrative county and is represented in its county council.

The borough is a place which has received a charter of incorporation, and, excluding the county boroughs, there are over 200 of them in England. Their local government is regulated by the

Municipal Corporation Act of 1835 and an amending Act of 1882. These made their constitutions uniform. Each borough, and each county borough also, is governed by a mayor and council consisting of aldermen and councillors. The councillors are elected for three years, one-third of them retiring every year, and they choose the aldermen, who form one-third of their number.

Since 1888 the affairs of these non-county boroughs have been supervised to some extent by the county councils, to which they send representatives. There is thus a division of authority. In some the borough has its own police force, in others the county council provides this. Education again is sometimes controlled by the one and sometimes by the other. These boroughs levy their own rates and also raise something towards the expense of the county council. A special class of boroughs are the 28 into which the county of London is divided. They are subordinate to the London County Council and their powers are somewhat different from those of the ordinary boroughs. Although of considerable size, they are not county boroughs.

#### Urban and Rural Districts

The country outside London and outside the provincial boroughs is divided into urban and rural districts, called into existence by an Act of 1894. Urban districts are the thickly populated areas which have not yet become boroughs; rural districts are the country areas. The division is not absolutely rigid, and occasionally a rural district is found to be quite populous. Each is governed by a council, elected for three years. The head is called chairman, not mayor, and there are no aldermen.

These councils work in general under the supervision of the county council. If their population exceeds 10,000 they manage their own education, but the chief duties of the bulk of them are connected with the public health.

#### A. W. Holland

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England. Map of the country under the Anglo-Saxons, showing the divisions of the heptarchy and the territories occupied by the various peoples

**HISTORY.** The departure of the Roman legions in A.D. 407 left Britain without any controlling government, but the old system of local principalities soon revived. The N. however, was open to attack by the Picts and Scots, the W. coast to invasions from Ireland, and the E. to raiders from the European coast. About the middle of the 5th century, Jutes from Denmark made a settlement in Kent which became permanent. During the next hundred years, Angles and Saxons sent fresh hordes which established themselves on the E. and S. coasts, pushing inland till they had mastered the country E. of a line running roughly from Dunbar to Portsmouth.

Between 560 and 613 the newcomers overran the midlands, pushing the Britons further to the W., and thrust wedges up to the sea both on the N. and on the S. of Wales. In 596 Christianity was introduced into Kent. Thence it spread N., where through the greater part of the 7th century Northumbria was the most power-

ful of the English states. In the 8th century the supremacy passed to Mercia, and in the 9th to Wessex.

The second half of the century saw a desperate struggle between the English and a new host of invaders, the Danes, who established their mastery over half the island, but were forced back by Alfred the Great. In the 10th century Edward the Elder and his sons subjugated the Danes, and the kings of Wessex became kings of England.

#### The Battle of Hastings

But the subjugation of the Celts on the Cumbrian hills and the Devon moors was slow and incomplete; while in Wales they successfully preserved their independence. In the 11th century Sweyn, king of Denmark, and his son Canute established a brief Danish dynasty; but on the death of the last of Canute's sons, Edward the Confessor was recalled to the throne of England. When he died in Jan., 1066, the English elected Harold, Godwin's son, as king, but the crown was claimed by William, duke of Normandy, who shattered Harold's

army at Hastings, and was crowned in London on Christmas Day, 1066.

During the next six years risings in the N. and W. compelled William to subdue the whole country by merciless force, and provided him with an excuse for confiscating much of the land and distributing it among his Norman followers, though a substantial number of small estates remained in English hands. Theoretically, the Norman king reigned as the legitimate successor of the Wessex kings, by the same laws, legislating with assent of the *Witan*, the assembly of magnates, occasionally expanded into the common assembly of such freeholders as might choose to attend. Actually the conquest effected a revolution, because all the magnates and half the barons or lesser landholders were now Norman instead of English; the law was interpreted by them in their own interests and they reduced many of their own tenants to serfdom or villinage.

#### Rule of the Normans

William and his two sons, William Rufus and Henry I, were powerful monarchs who utterly crushed the attempts of the new baronage to ignore or defy the authority of the crown. They called to their support the English population, who were infinitely more hostile to the local Norman tyrants than to the crown, though William II was himself a tyrant. After a reign of 35 years, Henry was succeeded by his nephew Stephen, whose claim to the crown was disputed by Henry's daughter, Matilda or Maud. The reign was a long horror of anarchy; the strife for the crown wrought less havoc than the private wars waged against each other by the barons, who pillaged, robbed, and murdered on all sides. The evil days were brought to an end on the death of Stephen in 1154 by the accession of Henry II, grandson of Henry I, the first Plantagenet.

Henry, already by inheritance or by marriage in possession of half France, did great work in the reorganization of the government of England. The baronage on the whole cooperated loyally with the king in the work. Revenues were collected, and the higher courts of justice were conducted by the king's officers, removable at his pleasure; the practical freedom of appeal to the royal courts against local injustice was greatly extended. The old system by which the king's officers could call up the freemen of the shire in arms was revived, counterbalancing the feudal right of every baron to call upon his own tenants for military service, while incidentally, through the practice of

obtaining the formal approval of the Great Council for the measures upon which the king had decided, the idea developed that the Council had a right to be consulted. In the course of the reign a Norman baronage was planted in Ireland, and, through the formal homage of the Irish chiefs, the island was annexed to the English crown.

Henry's elder son, Richard I, left the governance of the kingdom to justiciars, while he himself was engaged on crusade or in his French dominions. Public spirit and respect for law developed, so that in the reign of Richard's brother, John, who repeatedly overrode the law for his own ends, the barons combined to wring from him Magna Carta. Incidentally, also, John's reign brought about the severance of Normandy and most of the Plantagenet possessions in France from the English crown, making the baronage of England an English baronage with exclusively English interests.

In spite of Magna Carta, John's son, Henry III, in the course of a reign of 56 years, persistently attempted arbitrary and illegal methods of government, choosing for his ministers his own or his wife's foreign kinsmen in place of the English nobles, who regarded such offices as due to themselves of right. At length the baronial party combined under the leadership of Simon de Montfort, in effect to transfer the supreme control from the hands of the king to baronial committees. Faction among the barons led to the fall of Montfort in 1265.

#### Henry III and Parliament

But he had championed two great principles—first, that the sanctity of the law was to be maintained as sternly on behalf of the commons as on behalf of the barons; and, secondly, that the government should rest upon the assent of the realm expressed through the common council of the realm, which was now acquiring the name of Parliament. The practice of summoning thereto elected representatives of the freeholders had been developing all through the century; Montfort in 1265 established the principle of calling also representatives elected by the boroughs. Montfort himself failed, but his cause had triumphed. Acting as champion of the law, he, like Cromwell four centuries after him, found himself compelled to ride roughshod over the law, to adopt unconstitutional methods of asserting constitutional principles. His mantle fell upon the man who had overthrown him, who, as Edward I, made the law supreme.

The reign of Edward I is a crucial epoch in the history of England. In it the English nation, finally consolidated and unified, realized that the common interests of all classes were of more importance to each than the antagonistic interests of individual classes and groups; that the law which should be directed to the good of all should be uniform and fixed. It was the great era of definition, regulation, systematisation. It declared, though not finally, the powers of the crown for raising revenue, the jurisdictions of the baronage, the rights of the national assembly to consultation. It established the law of inheritance, and the subjection of the clergy to the civil law. Above all, it defined for 500 years the constitution of the national assembly itself; this being in the Model Parliament of 1295.

#### Yeomen and Serfs

But while Edward succeeded in unifying England and shaping the structure of the constitution upon foundations which had already been laid, he was not equally successful in accomplishing his desire of extending the unification to the whole island. Hard fought campaigns in Wales brought her into the English system; the attempt to absorb Scotland upon pretexts of feudal law forced her into temporary and incomplete subjection tempered by persistent insurrection, and finally issued in complete failure during the reign of his son and successor, Edward II.

During the 13th century England had become definitely the Merrie Hostland of the ballads. The old hostility of Norman and Englishman had disappeared. The rural population had fallen into the two divisions of those who had succeeded in preserving their legal freedom, the yeomanry, and those who had been thrust into serfdom or villeinage which bound them to the soil on which they were born.

But already the practice of commuting services for payment, and correspondingly of hiring service for wages was becoming widespread; the lot even of the villein was not generally a very hard one. The larger towns were flourishing commercial centres, although being still to a great extent agricultural communities which had purchased rights of self-government and immunity from the jurisdiction of overlords from the king. These rights were conveyed to them by charter. There was already an extensive foreign trade; cloths, wines, and many other European products being imported, while the leading English exports were

wool and hides, and rural products of all kinds.

An incompetent king, Edward II, succeeded Edward I. There was a recrudescence of the struggle between the crown and nobles, who looked upon themselves as the champions of constitutionalism, but were in fact endeavouring to concentrate political power in the hands of a narrow oligarchy. The civil strife, whether latent or active, caused that complete neglect of the Scottish question which enabled Robert Bruce gradually to clear Scotland of the English garrison, and to recover an unqualified independence by inflicting upon the English the decisive defeat of Bannockburn in 1314.

In 1327 Edward II was deposed and murdered by his French wife, Isabella, and her paramour, Roger Mortimer, while the crown was set on the head of Edward III. Three years later the king, then eighteen years of age, effected a *coup d'état* which ended the intolerable government of the regency, and executed Mortimer. All this time Plantagenets had retained possession in France of their hereditary fiefs of Guienne and Gascony, which successive French kings on various pretexts had sought to filch from them. This process was continued by Philip VI. On his accession, a fairly tenable claim to France had been put forward on behalf of Edward of England through his mother, the sister of the last king of France; but France had decided in favour of the Valois succession, and of the principle that there was no right of inheritance to the French crown by or through a female.

#### The Hundred Years' War

The strife over Guienne and Gascony was a standing cause of quarrel; the claim to the French throne provided another pretext; while a serious subject of contention was the attempt to restrict the valuable trade between England and Flanders which was a fief of the French crown. On account of this the Flemings were ready to take part with Edward if he assumed the character of their lawful suzerain by asserting his claim to the French crown, and on this combination of pretexts the Hundred Years' War between France and England was embarked upon in 1337.

The English longbow and the clothyard shaft had first been brought into effective play by Edward I in his Scottish wars. The Scots and Flemings had recently proved the power of



spearmen to defy the shock of the charge of mailed cavalry. The two principles were combined by Edward III and his son, the Black Prince. The English archery and dismounted men-at-arms shattered superior forces at the battles of Crécy (1346) and Poitiers (1356). King Edward captured Calais in 1347, to remain as a gateway to France for 200 years. In 1360 he forced on the French the treaty of Brétigny, which conceded to him a quarter of France in full sovereignty.

Twelve years later all that had been won was practically lost; England retained only a precarious hold upon a part of Guienne and Gascony, as well as Calais. The war was enormously costly, and its costliness developed the power of the Parliament, which was now strong enough to forbid the imposition of taxes, other than those formally sanctioned in the reign of Edward I, except by its own vote. The power of the purse passed definitely into the hands of Parliament, and with it a certain limited control of policy; the royal revenues were insufficient, at least for war programmes, unless supplemented by the land and property taxes, known as tenths and fifteenths, and afterwards as subsidies, which the lords and commons voted.

#### The Black Death

The general prosperity was checked by the tremendous visitation of the Black Death in 1348. A third of the rural population is said to have perished; for lack of labour the harvest was left to rot and the fields were left untilled, while famine followed upon the plague. The landholders sought to revive all their old powers of enforcing service; the peasantry refused to work except at very high wages, and the government stepped in with the Statute of Labourers, vainly attempting to fix a standard wage. A class animosity was born, quite different from the bygone hostility between the English occupants of the soil and their Norman conquerors. This bore fruit in the peasant revolt of 1381. The revolt was crushed, but was not followed by any enactments for the removal of grievances; the system of villeinage, forced agricultural services, and restrictions upon rural wages remained.

Edward III in the pursuit of revenue had grasped the advantages of encouraging and organizing trade under state supervision. The export of staple goods, wool, hides, etc., was restricted to the Company of the Merchants of the

Staple, trading only in authorised localities, known as the staple towns; the import of manufactured goods was mainly in the hands of foreign trading societies, notably the German Hanse; both groups paid for their privileges and enjoyed powers of regulating the traffic. But at the same time the process of manufacture in England itself advanced greatly, and English cloth goods began to compete in foreign markets as well as in England. Although a gloomy picture of rural life is presented in Langland's *Vision of Piers Plowman*, the pages of Geoffrey Chaucer convey an altogether convincing impression of an England materially prosperous, genial, and light-hearted, and full of a robust kindness.

#### Rule of the Lancastrians

Richard II (1377-99) found himself much in the hands of a faction of the nobility, who, however, could no longer usurp the functions now acknowledged to lie in Parliament. Soon after coming of age, he succeeded in recovering the royal authority, but though he ruled well for several years, he was unhappily nursing vindictive schemes and plans of arbitrary rule. He turned suddenly upon the nobles who had once held him in restraint, put some of them to death, banished others, and imagined himself undisputed master of the kingdom. But in 1399 his banished cousin, Henry of Lancaster, returned to England. The discontented nobles rallied to Henry's standard, Richard was deserted and brought a prisoner to London, a parliament was called, Richard was compelled to abdicate, and the parliament declared Henry king of England by lawful descent.

With Henry IV began the rule of the Lancastrian branch of the house of Plantagenet. Raised to the throne of the cousin who was done to death soon afterwards, while yet another cousin, the child Edmund Mortimer, had a better claim than his own to the succession as descending from an elder son of Edward III, Henry knew that he ruled by a parliamentary title. Parliament knew it, too, and the result was that the Lancastrian kings were very much at the mercy of their parliaments. Also, as clerical influences had been vigorously applied on Henry's behalf, the house of Lancaster was compelled to conciliate the clergy. Hence Henry was led to a rigorous suppression of the Lollards. The teaching of Wycliffe, about the end of the reign of Edward III, had attained considerable popularity during the reign of Richard II in a

country where the anti-clerical sentiment was always strong, until it began to be applied as a sort of communistic propaganda; but burning at the stake as the punishment for the unrepentant heretics first became the law of the land in the reign of Henry IV.

That monarch's uneasy rule of fourteen years was followed by the brilliant reign of his son Henry V. In the anarchy which had overtaken the French kingdom, Henry found occasion for a preposterous revival of the claim of Edward III to the French crown. In 1415 he invaded France, captured Harfleur, and at the head of no more than 8,000 men won the victory of Agincourt. Three years later he returned to France and set about a systematic and organized conquest. The factions of French politics brought over to his side the powerful duke of Burgundy and the French queen, when all Normandy was already in his possession. The king of France was compelled to acknowledge Henry as his heir, while the dauphin Charles and the greater part of France remained defiant. Inch by inch Henry made himself master of N. France, but in 1422 he died, leaving the English crown and the French succession to his infant son, Henry VI, and the government of the country to a council of regency.

#### Loss of Burgundy and Guienne

The resources of England were not equal to a conquest of France. In spite of the abilities of Henry's brother, John, duke of Bedford, the subjugation proceeded slowly, and was stopped altogether by the extraordinary interposition of Joan of Arc. The death of Bedford himself in 1435 was fatal to English ambitions; the defection of Burgundy was still more decisive, and from that time the record of the French war was one of almost continuous defeat; until in 1453 even Guienne was lost, and Calais was the only foothold left to the English in France.

The usurpation of Henry IV and the aggression of Henry V brought their Nemesis. Popular disgust was kindled against the faction who exercised control over the imbecile Henry VI as being responsible for the disastrous mismanagement of the war and the feeble government at home. The opposition was led by Richard of York, representative of a branch of the descendants of Edward III senior to the house of Lancaster. Richard claimed to be the effective head of the government. The rebellion of Jack Cade in 1450 was not, as is commonly supposed, an

agrarian rising like that of Wat Tyler, but was, primarily at least, a popular protest against the unpopular government. The strife of the factions in high places issued in the War of the Roses.

From 1455 to 1460 war and truce between the parties alternated. It was not until 1460 that Richard startled his own supporters by asserting his own claim to the crown, a claim modified into demand for recognition as the heir, although King Henry had a young son. Richard was killed at the battle of Wakefield, but his son Edward, supported by Warwick, proclaimed himself king, shattered the Lancastrian army at Towton in 1461, and maintained himself on the throne till his death in 1483.

During the first ten years of his reign there were repeated Lancastrian insurrections; the defection of Warwick actually drove Edward IV in flight from the country in 1470; but, returning in the next year, he crushed Warwick and the Lancastrians at the battles of Barnet and Tewkesbury, and for the rest of his reign ruled without fear of any rivals.

On Edward's death his brother, Richard of Gloucester, after an interval of a few weeks usurped the throne of his young nephew Edward V, who was shortly afterwards murdered in the Tower with his brother. The usurper instituted a reign of terror so intolerable that after two years Henry Tudor, earl of Richmond, a descendant of John of Gaunt, though by an illegitimate line, and the acknowledged head of the Lancastrian party, was able to return to England from the exile into which he had retired, to slay Richard III at the battle of Bosworth, and to claim the crown, a title acknowledged by the parliament which he summoned.

#### The Reign of Henry VII

During 25 years the power of the sword had decided who was to be king in England; parliaments had been summoned, but were attended only by partisans of the dominant faction. Each side had attained of treason all the leaders on the other side, put them to death when it could lay hands on them, and redistributed their estates. The old families were almost blotted out, and the new generation of nobles bore names which had hardly been heard of fifty years before. It was the business of Henry VII (1485-1509) to restore peaceful and orderly government, commercial prosperity, and reforms, at least of law. The claws of rebellion were clipped and the royal treasury was simultaneously filled by the systematic process of fines

and confiscations, drastically applied wherever an excuse could be found. Parliament was habitually summoned and treated as the king's responsible partner in all his acts.

Foreign policy was directed to the development of commerce and the acquisition of indemnities for campaigns on which nothing had been spent; commerce itself, on the other hand, was applied as a weapon for making the rulers of France and Burgundy compliant. The king ruled always by forms of law; taxation and legislation were the province of parliament, though a skilful king rarely failed to procure from parliament the powers or the money which he required. Rebellions raised on behalf of pretended members of the house of York, Lambert Simnel and Perkin Warbeck, were suppressed. Henry's marriage to Elizabeth of York put the title of his son to the succession beyond question; the marriage of his daughter Margaret to James IV, king of Scotland, in 1503, placed a Stuart on the English throne as the legitimate monarch a hundred years later. When Henry died in 1509 the house of Tudor was firmly established on the English throne, and the crown with a full treasury enjoyed an almost unprecedented power.

#### The Discovery of America

The reign of Henry VII fell upon that period of transition when the medieval world was passing into the modern. In 1477 the first printing press had been set up in England. The intellectual movement long active in Italy reached England and awakened a new spirit of criticism. Columbus discovered the West Indies, the Cabots from Bristol reached Labrador, the Portuguese sailed across the Indian Ocean to India. Europe was emerging into a new state system. With Henry VII dawns the conception of international relations as being concerned with the preservation of a balance of power among the great states. In the reign of Henry VIII (1509-47) Cardinal Wolsey stands out as the diplomatist who made it his aim to hold the balance between the king of France and the king of Spain, who was at the same time lord of the Netherlands and German emperor—Charles V.

But Henry's international activities were merely an episode. The great feature of the reign was the ecclesiastical revolution which fixed the grip of the state irresistibly upon the church, annexing the greater part of its wealth, and repudiated the authority of the papacy. The instrument of

the revolution, the artificer who designed its methods, was Thomas Cromwell, who, after Wolsey's fall in 1529, won Henry's confidence and retained it till 1540, when he had completed the work, not only of subordinating the church to the crown, but of obtaining for the crown by strictly legal parliamentary process such a latitude of power as it had never before possessed.

#### Edward VI and Mary

When Henry initiated the ecclesiastical revolution with the primary object of getting rid of his wife in order to marry another, he took the nation into partnership and secured parliamentary sanction for everything he did. He, however, procured from it first a weapon for silencing all external opposition in the Treasons Act of 1534, and then a virtually absolute authority for himself, though not for his successors, by the Royal Proclamations Act of 1539. Henry left one young son, whose legitimacy was indisputable, and two older daughters by mothers whose marriages with him had both been pronounced invalid, though before his death it had been formally laid down that the right of succession remained to both children.

While Edward VI was king (1547-53) the government was in the hands of a council controlled first by Edward's uncle, the protector Somerset, and then by John Dudley, earl of Warwick, best known as duke of Northumberland.

Henry's extravagance had depleted the treasury; he had suppressed the monasteries, the only institutions in the country which were officially concerned with the relief of poverty. For more than half a century the peasantry had been ousted from the land, and distress and suffering were widespread.

Both Somerset and Northumberland, from conviction or from policy, actively fostered the religious reformation, and carried out the protestantising of the Church with gross and unseemly violence, though without extreme persecution. The accession, however, of Mary in 1553 was followed by an extreme reaction with the sanction of parliament—under which some 300 persons, including five bishops, were burnt at the stake. The effect of the persecution was not the suppression of heresy, but the development in the popular mind of an intense hostility to Romanism. The general impoverishment and the miserable misgovernment during the two reigns of Edward VI and Mary brought England to such low estate that she was unable to

retain her hold upon Calais, which was retaken by the French in 1558, leaving her without a footing on the Continent for the first time since 1066.

Elizabeth in 1558 found the country in evil case indeed, but with all the elements for a glorious recuperation. An unfailing judgement in the selection of counsellors and instruments, a supreme confidence in the spirit of the nation with which she identified herself, a complete freedom from conscientious scruples, an intuitive perception of the weaknesses of her enemies, a perfect mastery of stage effects, united with an indomitable determination to raise England to the position of the first power in the world, made her the most brilliantly successful of all English monarchs. The national finances were reorganized with a rigid economy which ensured full value for every penny spent.

The question of religion was taken in hand, on the principle of permitting the widest possible latitude of opinion compatible with uniformity in practice, while explicitly requiring the subordination of all authority to that of the state, and rejecting any compromise which implicitly attributed authority to the pope. The enterprise of the seamen who set at naught the Spanish claims to a monopoly of the New World was unofficially encouraged. Nearly thirty years passed before that open rupture with Spain came, but by that time England was ready, and there came the annihilation of the Spanish Armada, in the fight of July 20-August 2, 1588.

#### Period of General Prosperity

A regular government, pursuing a popular policy with conspicuous success and with increasing stability, free from every kind of unsettling capriciousness, encouraged energy and enterprise in every direction. The regulation of trading and apprenticeship, the multiplication of chartered mercantile companies, the gradual readjustment of the rural population to the agrarian upheaval of the first half of the century, and the judicious experiments which culminated in the poor law of 1601, established a general prosperity. The queen ruled, but always with the express assent of her people.

Elizabeth was the last of the offspring of Henry VIII. She was succeeded therefore by the legitimate heir, James VI of Scotland, the great-grandson of Henry's elder sister Margaret. James I (1603-25) came to the throne of England with a title less disputable than that of any monarch since Richard II,

except Henry VIII and Edward VI. By the peculiar cunning which he called kingcraft, he had already acquired for the crown in Scotland a control over the government enjoyed by none of his ancestors since Robert Bruce. James claimed and sometimes tried to exercise the power of overriding the law by divine right; but a wholesome fear of arbitrament by battle always kept him from overstepping the limits of English endurance. He wrought the country up to a high pitch of irritation, destroying utterly the basis of mutual goodwill between the crown and the people, which had in fact been the basis of the apparently despotic authority of the Tudors.

#### Charles's Struggle with Parliament

Charles I (1625-49) reaped the bitter fruits of his father's theories. Elizabeth's parliaments loved her and bore with her caprices. The parliaments of the Stuarts did not love them at all, and were only too ready to discover grounds for quarrelling with the monarch. Charles gave them ground enough by entrusting the direction of policy to his favourite, George Villiers, duke of Buckingham, by standing on what he regarded as his legal rights of raising revenue without sanction of parliament, by overriding the law in the punishment of recalcitrants, and by repressing all latitude of religious doctrine and observance; enforcing his will through the arbitrary powers of the courts of Star Chamber and High Commission.

Charles's parliament, on the other hand, refused supplies until grievances should be removed, asserted the novel claim to a right to the control of religious affairs, and in 1628 compelled the king to accept the Petition of Right, which unfortunately failed of its precise purpose—the accurate definition of the limits of the royal prerogative. Eleven years of arbitrary rule without parliament were ended in 1640 by the arming of Scotland—an independent kingdom to whose king accident had also given the crown of the neighbouring kingdom of England. Scotland found the king's rule too arbitrary: the king could not suppress his Scottish subjects without the aid of English arms; all his expedients had not provided him with the money for an army, and he was obliged to summon the English parliament, and then to dissolve it, and summon it anew.

The Long Parliament, instead of aiding him against the Scots, attainted and beheaded Strafford, impeached Laud, and proceeded to force the king to accept a

series of enactments abolishing the arbitrary courts, and explicitly depriving him of the disputed prerogatives. A *coup d'état*, the attempted arrest of five members on Jan. 4, 1642, failed completely; the king left London, and after several months of futile negotiation, the great Civil War opened in August, 1642.

The struggle was conducted with a decency and humanity which offer a pleasing contrast to the horrors of the Thirty Years' War, then raging on the Continent. After various vicissitudes, the army of the parliament was reorganized by Oliver Cromwell and won the decisive victory of Naseby on June 14, 1645. Charles surrendered to the Scots, who had associated themselves with the cause of parliament, in May, 1646, was by them handed over to the parliament in Feb., 1647, and was carried off into the custody of the army on June 3. From his confinement he intrigued with his own supporters and negotiated with three separate groups—the chiefs of the parliament, the chiefs of the army, and the Scots—each of whom now had different objects in view. The king's attempt to recover his ascendancy by playing them off against each other failed disastrously. His own attempt to escape to France in November, cavalier insurrections, and a Scots invasion in 1648, threw the control into the hands of the victorious army, and determined its chiefs that the king's death was the necessary condition for the restoration of a stable government. An arbitrary court condemned him to death and he was executed on Jan. 30, 1649.

#### The Commonwealth

England was now proclaimed a commonwealth or republic. The Scots recalled the prince who was *de jure* Charles II, but the English Commonwealth could not afford to have the claimant to the throne of England seated on the throne of Scotland. A war with the Scots followed and culminated in Cromwell's crowning victory at Worcester (Sept. 3, 1651), but Charles II made his escape from the country. The remnant or rump of the parliament, which had constituted itself the sovereign body by its own authority, sought to transform itself into a permanent oligarchy, with the result that it was forcibly ejected by Cromwell in April, 1653; and from that time Cromwell, who was made lord protector by the army in December, was virtually the absolute ruler of England. The former champion of parliamentary government found all attempts to work in harmony with the

parliament vain. His government was necessarily arbitrary, but strove at least to be as just as the circumstances permitted, while his vigorous Imperial policy, though it helped to raise France to a dangerous height of power, made England feared on the Continent as she had never been feared before. With Cromwell's death (1658) came chaos. The country was sick of the rule of soldiers and saints, and it was with a practically unanimous satisfaction that Charles II was recalled to the throne (1660).

The Restoration meant nothing as all like the triumph of the Stuart conception of monarchy. Half the royalists in the Civil war had been men who had been on the side of the parliament against the king until the parliament of 1641 was dominated by the advanced Puritan element. The country intended parliament to be predominant, and, as far as concerned legislation and taxation, the king found that it was neither to be cajoled nor overriden. But parliament, rendered by the arbitrary Puritan rule of the Commonwealth intensely hostile to Romanism, to the surprise and disappointment of Charles, who had promised himself and his cousin, Louis XIV of France, the restoration of a Romanist ascendancy.

#### Charles II and Parliament

Under the mask of frivolity and dissipation, however, Charles concealed an invincible determination to avoid fighting with parliament in deed, but to make himself entirely independent of it by secretly selling himself and the country to the king of France. For 25 years he successfully deceived statesmen, courtiers, politicians, English and foreign, and the king of France himself. On March 28, 1681, with Louis XIV's purchase money in his pocket, he dissolved his last parliament at the moment when its leaders imagined that he was fast in their grip. In those 21 years he had built up a standing army sufficient for his purposes. In the next three years he cancelled and renewed the charters of the boroughs in such a manner that the crown had a practically absolute control over their parliamentary elections.

Having no legitimate children, he had secured the succession to his Roman Catholic brother James. His death left James II with all the master cards in his hands, had he but known how to play them skillfully. Fortunately he did not. The loyalty of the country was turned first into uneasiness and then into

grim hostility. When he alienated ardent royalists and fervent churchmen by arbitrarily suspending or overriding the law for the advancement of Romanism, men of every party joined in calling to their aid his son-in-law, William of Orange. William landed in Tor Bay on Nov. 5, 1688. James took flight, and on Feb. 13, 1689, William and Mary were proclaimed king and queen of England, having accepted the declaration of right which laid down what were to be in future the fundamental limitations of the power of the crown—limitations which were put forward as the historic right of the people. Scotland followed suit and the crowns remained united.

#### Development of the Party System

The accession of the stadtholder of Holland, the lifelong enemy of Louis XIV, carried England full into the vortex of international politics. The ascendancy of the English navy, long disputed by Holland, and now for a moment challenged by France, was decisively established and was never again lost save for a moment between 1779 and 1782. The right of parliament to fix the course of the succession to the throne was established; the state system of finance was reconstructed by the creation of the national debt and the Bank of England. The party system inaugurated by Shaftesbury under Charles II developed steadily. William died on March 8, 1702, at the moment when he had organized the Grand Alliance which was plunging England into the War of the Spanish Succession. He was succeeded by Anne, the second daughter of James II, under whom that war was fought out to its issue. But another issue had arisen. Scotland demanded a permanent union with England upon terms agreeable to herself, threatening in the alternative to name for Scotland another successor to the throne than that of England. On May 1, 1707, the Act of Union came into effect. From that hour the history of England as a sovereign state is merged in the history of Great Britain.

A. D. Innes

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Hist. of the English People, J. R. Green, brought down to 1914 by A. Stopford Green, 1917; Outline of English History, S. R. Gardiner, new ed. 1919.

**Englefield.** Parish and village of Berkshire, England,  $5\frac{1}{2}$  m. W.S.W. of Reading. Here Alfred defeated the Danes in 870. Pop. 399.

Englefield Green is a residential district in Surrey,  $1\frac{1}{2}$  m. N.W. of Egham at the S. of Cooper's Hill. The cottage on the green was for some years the home of George IV's Perdita (Mrs. Robinson).

**English Bazar** OR ANGRAZABAD). Town of Bengal, India, in the Malda district. It stands on the right bank of the Mahananda river, 56 m. N. of Murshidabad. The East India Company established a silk factory here, and there were also Dutch and French settlements. The chief trade now is in grain. An embankment prevents the overflow of the Mahananda. Pop. 15,000.

**English Channel** (Fr. *La Manche*, the sleeve). Stretch of water separating the S. shore of England from the N. coast of France. It communicates with the North Sea on the E. and the Atlantic Ocean on the W. Its extreme length from the Strait of Dover to a line drawn between Ushant, in France, and Land's End, in Cornwall, is 280 m. Its width from Dover to Cape Griz Nez is 21 m., from Land's End to Ushant 110 m. Its widest part is between St. Malo and Lyme Regis, a distance of 145 m. Its maximum depth is 70, its average depth 30 fathoms. In the Strait of Dover there is a chalk ridge at a depth of 12 fathoms. The bed of the channel is composed of coarse gravel. England has a coast line of 392 m., while the French seaboard is 574 m. Many rivers discharge their waters into the Channel, the principal being the Seine, on the French coast. The chief islands are the Isle of Wight, and the Channel Islands. Fishing is carried on, the principal catches being mackerel and pilchard.

**English Church Union.** Association of clergy and laity of the Church of England. It was founded in 1859 for the defence of the doctrine and discipline of the Church. It is the leading organization of the High Church party, and has frequently defended clergymen charged with illegal doctrine or ritual. Lord Halifax was president until 1920, when he was succeeded by Sir Robert Newman. Its organ is the Church Union Gazette.

**English Horn.** Double-reed wind instrument of the hautboy family, and of tenor pitch. See Cor Anglais.

# ENGLISH LANGUAGE AND LITERATURE

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*This article is divided into two sections. The language may be studied further under Alphabet; Phonetics; while for the literature there are articles on the great figures of English literature: Milton; Shakespeare; Dickens; Fielding, and others. See also the general article Literature, and those on various verse and prose forms, e.g. Ballad; Essay; Novel; Ode*

The earliest form of English—from the beginning to about one hundred years after the Norman Conquest—is sometimes called Anglo-Saxon, but nowadays more generally simply Old English. The people who lived in the oldest period called themselves *Angel cynn*, and their language *Englisc* in the vernacular, or, in Latin, generally *Angli*, sometimes *Angli sive Saxones*, and *Sermo Anglicus* or *Lingua Saxonica*. These terms are applied to all the tribes and to all the dialects.

Old English is shown by its vocabulary and its system of inflexions to be a W. Germanic language, closely akin to Old Frisian and Old Saxon, and still closely, though more remotely, to the High German dialects. The resemblances between Old English and Old Frisian are indeed so great and numerous that some regard these two groups of dialects as forming a special branch of W. Germanic speech subsequently differentiated into English and Frisian which they call the Anglo-Frisian branch. From the earliest records four main dialect types in Old English, corresponding to tribal divisions, may be distinguished: the Anglican dialects, i.e. Northumbrian and Mercian; the Saxon dialect; and the Kentish, spoken by the Jutes. The differences between these are comparatively slight, so far as they can be traced in the records, but the subsequent history of the several types is very different. The Angles settled in the N. and Midlands, the Saxons in the S. and S.W., and the Jutes in Kent, the Isle of Wight, and parts of Hampshire.

## The Old English Alphabet

The English, in common with other Germanic tribes, possessed an angular-shaped alphabet suitable for cutting or scratching upon metal, bone, and other hard substances. This is known as the Runic Alphabet, and the letters are called runes. A few inscriptions in this form survive on stones and whalebone, but probably none are much older than the oldest written documents of the ordinary kind. After the introduction of Christianity, the English learnt the art of writing from Irish monks, and the ordinary Old English alphabet is almost identical with that in which Old Irish was written. It was soon found convenient, however, to

borrow from the Runic alphabet two symbols to express characteristically English sounds—þ called "thorn" for *th*, and ƿ called "wen" for *w*. In modern editions of Old English works it is now unusual to reproduce the shapes of the MS. letters, which are printed in ordinary type except þ and ƿ which also stands for *th*; the vowel symbol æ, for the vowel sound in Modern *hat*; and occasionally ȝ the Old English form of *g*. The spelling of Old English, allowing for certain inconsistencies, is on the whole phonetic.

## Sound Changes and Dialect

Perhaps the most important aspect of the evolution of language is the change in pronunciation which continuously proceeds. Sound changes have a far-reaching effect upon the history of every language and bring much else in their train. Not only does sound change alter the whole external aspect and character of a language, so that by this means chiefly, or alone, dialect is often differentiated from dialect, and language from language, but sound change involves the alteration, or it may be the destruction, of inflexional suffixes, whereby the main features of accent are modified or swept away, and these losses of significant endings may, and often do, bring about a revolution in the syntax of the language.

It is now recognized that sound changes are regular in their effects, and that they take place, within a given period and in a given language, according to definite principles and conditions. Within the above-mentioned limitations of time and language and phonetic conditions the same sound will always change in the same way or direction. By the side of regular sound change, the principle of linguistic analogy, or the close association of form with form, whereby one is modified by the other, without normal phonetic development, is recognized as of hardly inferior importance to the action of phonetic laws. It must be remembered that language cannot exist apart from living human beings who speak it, and that change in language implies a change in the physical and mental habits of the speakers.

THE HISTORY OF ENGLISH. The history of English may be said to

have begun from the moment when the group of dialects known as Old English had become differentiated from the parent W. Germanic stock. At the moment of its earliest appearance in a written record, Old English had already undergone a number of characteristic changes which separate it from the nearest cognate languages. Under the conditions of complete geographical separation from the speakers of the other W. Germanic languages of the Continent, English underwent still further independent changes.

While alterations in the consonant changes were comparatively slight, those involving the vowels were considerable. There are two main classes of sound changes: *Isolative*, which arise in the sound of a language in the course of its history, without any discoverable reason, and without any influence exerted by the neighbouring sound in the word or sentence; and *Combinaive*, which result from the influence of one or more sounds in the word, or sentence, upon another sound, or from the effect of the position of the accent or stress in native words, upon the root syllable, not upon the prefix or suffix. In English, unstressed syllables have always been very liable to weakening, and are often eliminated altogether.

The Old English vocabulary is of a characteristic W. Germanic nature, and the great bulk of words are of this origin. There is, however, a considerable element of Latin loan-words: (a) those borrowed during the Continental period, e.g. *stræt* "street," Lat. *strāta viā*, paved way; (b) those borrowed from Latin-speaking Britons in this country, such as *ceaster*, town, Lat. *castra*, camp; (c) those borrowed from Roman ecclesiastical sources, e.g. *pāpa*, pope.

## Effect of Spoken Latin

Latin must have been freely spoken among the upper classes of the Britons, and in the larger towns of Britain. Several Latin words which expressed ideas for which no equivalent existed in Old English were literally translated, such as *welwilledd* for *benevolens*. It has been suggested that, if the English invasion had not taken place, the chief language of the country would not be a form of Welsh, but more probably a neo-Latin, or Romance language. Celtic exerted

only a small influence upon the vocabulary in the Old English period, except in the names of hills, rivers, and other geographical features, which retained their old designations—*pen, avon, cumb, dūn*, etc. The Scandinavian influence, which began in the 8th century, shows very slight traces in the written documents before the 11th, by which time the English and the Danes in certain districts had amalgamated, and having passed through a bilingual stage, had settled down together, with English as the surviving language in a form which retained many elements of the language of the once hostile settlers.

With the rise of Wessex to the ruling political position among the Old English states, the literary labours of King Alfred made the dialect of this province the chief vehicle of literature. All the works of literary importance, both poetry and prose, which have survived, are written in a form of West Saxon, occasionally with traces of other dialects. This form of English may be regarded as a common literary standard for the whole country from the beginning of the 10th century.

#### From Old to Middle English

The Conquest had at first little effect upon the spoken language. Few Englishmen learnt French for several centuries, and they could not borrow words from a language which they did not know; nor was there any reason why the presence of foreigners ignorant of the native tongue of the country should in any way affect its pronunciation and inflexions. The changes made apparent by the spelling in the middle of the 12th century are not the result of the Norman Conquest, but the normal development of tendencies which were active before the Normans came. The rather abrupt contrast observable in the language of documents from about 1150 onwards does not represent any sudden new development, but implies that the old literary tradition, which largely concealed the facts of speech by means of an antiquated convention, has almost passed away, and that a new literary convention, and to some extent a new scribal mode of spelling, have begun which are nearer to the language of everyday life than was the older tradition.

The language of the last part of the Laud, or Peterborough Chronicle, written soon after 1157, is still in a sense Old English, but many changes are observable. The highly inflected Old English definite article has to a great extent given way to an uninflected form, *þe*,

"the," which never varies, but takes prepositions before it to express case-relations which Old English expressed by inflexion. Such constructions as *þe wrece men of þe land* "the wretched men of the country," *betwux þe kinges freond and þe earles freond* "between the king's friends and the earl's friends," sound strangely modern. Already in the latter part of this Chronicle the unstressed vowels are fairly regularly written *e*, as in the later Middle English period, to represent Old English *o, a, u* and *e*. The Norman scribes have taught the Englishman the useful graphic distinction between *f* and *v*, whereas the latter formerly wrote *f* for both sounds. The Old English accusative singular of the third personal pronoun masculine, *hine*, has already been lost in favour of the dative *him*, as at present, the feminine pronoun *scæ*, the ancestor of *she*, first appears instead of the old *hēo*.

The present-day use of a preposition at the end of a sentence occurs—*me lihte candles to æten by* "men lighted candles to eat by." The case-endings of adjectives are largely lost. Although most of the typical Middle English changes in the vowels are not yet consistently expressed in the spelling, there appears an uncertainty and a tentative groping after the best way of expressing a pronunciation which is evidently changing. As regards vocabulary, a few French words are used, all more or less technical, expressing new and foreign conceptions or institutions, offices or titles—*canceler, prison, contesse, emperice*. The only word which might be considered non-technical and belonging to everyday life is *pais*, "peace." A few new Scandinavian words are used: *þōc* "took," and *oc* "and." The usual English words *niman* "take" and *and* are also used.

#### The Middle English Period

This may be held to begin about 1200. The process of change is more rapid in the dialects of the N. and those of the E. Midland than in those of the S. and of the S.W. Midland. In the N. especially the loss and confusion of flexional endings has gone very far by the beginning of the 14th century. A characteristic of the Middle English period is the great dialectal variety which finds expression in the written documents. The main types are the N., which includes the dialect of S. Scotland; the E. Midland; the W. Midland; the S.W. Midland, including the dialects of Herefordshire, Worcestershire, Oxfordshire, and Shropshire; the S. dialect, including all types as far

E. as Surrey; the S.E., including the speech of Kent and Essex. The London dialect, which in its earliest forms shows a mixture of purely S. with Kentish or S. Eastern forms, becomes increasingly important from the first quarter of the 14th century onwards.

#### The London Dialect

Early in the 14th century the London dialect is still largely pure S. in type, that of Surrey and Middlesex, but shows certain Kentish or S.E. features, and a slight tinge of E. Midland. By the end of the century, Chaucer and those of his contemporaries who write in this dialect show an increasing number of purely E. Midland features, rather strong S.E. influence, and a certain survival of S. characters. Chaucer is fairly representative of the best London and court English of his day. Owing to the political and commercial importance of the capital, the type of English there spoken was naturally bound to become the leading variety in the country, and the prestige of Chaucer and the popularity of his writings led to many imitations, not only of his style but of his dialect, even among writers who did not speak London English.

Nevertheless, for the most part, throughout the 14th century, people continued to write in the dialect which they spoke. The beginnings of a change may be seen when Chaucer's contemporary, Gower, writes, not in the Kentish dialect which was naturally his own, but in a close approximation to that of London, with but few provincialisms to betray his native dialect. The Middle English period may be said to close with the death of Chaucer, or in the first quarter of the 15th century, and soon after that date there are no more literary works written in pure provincial dialect, except in Scotland, which had a standard of its own, so that the history of English centres more and more round that one form which has become the universal standard. But while the London type predominates increasingly in written documents of all kinds, from whatever area, there are plenty of traces, far into the 15th century, of the provincialisms of the writer's native speech.

The vocabulary of Chaucer is very largely our own. He uses Norman French words, not here and there, like early Middle English writers, but as indispensable elements of his style. Norman French words are no longer foreign, but hundreds have penetrated into the very fibre of English speech, and it is not very easy to write many consecutive sentences not containing words of



this origin. Norman French having been the language of the upper classes for nearly 300 years, and the official vehicle of law and government, was abolished in courts of law in favour of English in 1362; in 1385 it was no longer used in schools; by the end of the century it was probably dead as a spoken language. The Scandinavian element is very large in Middle English in the N. and E. Midland dialects.

#### Modern English

The chief event in the general history of English since the beginning of the 15th century has been the gradual acceptance of a virtually uniform dialect by all writers. This agreement was greatly helped by the introduction of printing in 1476. Caxton, himself a Kentishman, adopted the London dialect for his translations and prefaces, and a knowledge of this type was rapidly diffused throughout the country through his labours. Even by the middle of the 15th century, provincial or regional dialect was falling into disuse in writing.

The adoption of a standard of spoken English was a much slower process. George Puttenham, in his *Art of English Poesie* (1589), says that in the N. noblemen and gentlemen spoke their own dialect; Aubrey has it from one who knew Sir Walter Raleigh that he spoke broad Devonshire all his life. In the 17th century comedies country gentlemen who come to London for the first time are made to speak a broad rustic form of English, and as late as the 18th century Fielding makes Squire Western speak pure Somersetshire. It was the language of the court which in Elizabeth's day was recognized as the best form of spoken English, and upon this the literary English of the day, the ancestor of our own, was based. The English of Caxton is virtually the descendant of that of Chaucer. The differences between the two are due chiefly to the growing encroachment of the E. Midland element in London English since Chaucer's time.

Since the Middle English period English pronunciation has changed considerably, although the conventional spelling handed on, with few modifications of importance, from the early printers who derived it from the professional Middle English scribes, reveals next to nothing of this. All the long vowels and all the Middle English diphthongs have altered completely in character. Many changes in the pronunciation of consonants have also taken place, though some of these have since been

"restored" through the influence of the received spelling. The same factor has influenced to some extent the pronunciation of unstressed vowels which in the Early Modern period had undergone considerable weakening.

It is a necessary result of the recognition of a standard dialect, which in origin was that of the upper classes, that other forms fall into disrepute, and are considered either vulgar or merely provincial and rustic. The latter epithets are now applied to the modern regional dialects, while the former justly applies to certain forms of English, cognate with the best form of spoken English in origin, but differentiated from it in the mouths of the humbler and less refined classes of society. The principal sound changes were probably complete, or at least well under way, by the end of the 16th century, though the final distribution of the various dialect types which compose standard English was not yet finally settled. The subsequent history of standard spoken English is very largely the result of the influence exerted upon this by other class dialects, and to some small extent by regional or provincial dialects.

#### Modern English Sound Changes

The changes made in the English vowel system from the "Continental values" to approximately our present pronunciation are traceable from occasional spellings of the scribes, in some cases as early as the early 14th century, very clearly and frequently in the 15th century, when private letter writing began to be practised by all sorts of persons, and in the 16th and later periods, not only from this source, but also from deliberate descriptions of English pronunciation. Most of the typical modern vowel changes began very early, but acceptance of many of these in court English was considerably later than the 15th century, and some appear to have been accepted only in a few words. Many of them were considered vulgarisms at first, and penetrated into the standard language through the influence of lower class London English. Many pronunciations used by the best speakers during the 17th and 18th centuries would now appear vulgar, rustic, or, at least, antiquated. Among these may be mentioned *sarvis*, *sarvant*, *sarmon*, *vartue*, *Booshop*, *gould*.

There is ample evidence from the 15th century onwards that the present day natural pronunciation of the vowels in unstressed syllable, either with the "murmur vowel" (ə) as in second syllable of *father*,

or with *i* was already in vogue. In the 18th century words with *on* were often pronounced as with *in*, e.g. *flaggin*, *dunjin*, *sturin* for *flaggon*, *dungeon*, *sturgeon*, etc. The ending *ure* was pronounced like *-er* far into the 18th century—*joiner*, *picter*, *nater*, etc. Such a word as *fellow* was pronounced *feller* (without *r*), and Pope rhymes it with *prunella*. The present-day pronunciation of the suffix *-es*, *-est*, *-eth*, etc., as *-iz*, *-ist*, is already established as the polite one in the court English of the 15th and 16th centuries by such spellings as *horsis*, *princis*, *eldist*, *givith*, etc.

#### Spelling Pronunciation

In the 18th century *nus*, *pus*, *Usly*, *thusty* are the spellings of a writer on pronunciation to express the proper forms of *nurse*, *purse*, *Ursula*, *thirsty*. The ending *-ing* was pronounced as *-in* as early as the 15th century, and this was probably universal in standard English until the end of the first quarter of the 19th century, when the spelling-pronunciation won the day to some extent. Usage now varies. The loss of the sound of *gh* in the middle of words before *t* is shown to have been caused in the 15th century by the omission of the symbol in words where it belongs historically, and by such spellings as *dought* "doubt," *ought* "out," *wright* "write." In the 16th century even Spenser often writes *whight*, *quight*, etc. The sound of *w* develops initially before *o* and *ho*; *won* for *one* is fairly common in the 15th century, and in the 16th occurs in the letters both of Henry VIII and Elizabeth. The spelling *whole* has been retained. Consonants are often lost, finally and in combinations, as is proved by spellings from the 15th century onwards.

Similar pronunciations are recorded in the 18th century. The following 15th and 16th century spellings show losses in combinations in the middle of words: *Whysson weke* "Whitsun"; *Wens-day*, *morgage*, *sepkury*, *Woetreet* "Wood Street." Queen Elizabeth herself writes "often" *offen*. *Lunnon* was a polite 18th century pronunciation. Many of these forms survive at the present time, but the consonants are now often restored from the spelling. At the beginning of unstressed syllables *w* was normally dropped already in Middle English. It has been largely restored, however, through the influence of the spelling. While *w* is still omitted in *Norwich*, *Southwark*, etc., it has been restored in *forward*, earlier *foward*, *Edward*, etc. *Eddard* was the polite 18th century pronunciation, and

survived as such among old-fashioned speakers far into the 19th century.

Weak plurals are more frequent among good writers in Early Modern English than now, e.g. *housen, shone, eyen, All Soulen, penon*, etc. The old feminine possessive without *-s* is found commonly as late as the 16th century—*Our Lady Mary Grace, the Queen Grace*, etc. These survive now in *Lady Chapel, Lady Day*. The personal pronouns *her* (possessive) and *hem* (dative plural) are frequently used in the 15th century by the side of *their, them*. The former is apparently not found after the early 16th century; the latter is rare in the 16th and early 17th, but reappears in the 18th century as *em*. "Group inflexion" in the possessive of nouns is found as early as the 15th century—the *erle of Willones wyf*—by the side of the older construction, *the dukys daughter of Northfolke*. Such constructions as *for Jesus Christ His sake* are very common in the 15th and 16th centuries, the pronoun being often detached and written *is*, and sometimes joined to the preceding noun as a possessive suffix, which indeed it originally was in this case.

#### Continuity amid Constant Change

The old Southern present plurals of verbs in *-eth* linger on in occasional literary and colloquial use far into the 16th century, though the form without ending is far commoner. In the 15th century the forms in *-en, -in* are still often used. The third person present singular ends in *-eth, -ith* or *-th* during the whole of the 15th and 16th centuries in the best English. The forms in *-s* come in very gradually, and are at first chiefly used either in poetry for the sake of rhyme or metre, or in fairly colloquial style. They are by no means universal by the end of the 16th century. *Hath* and *doth* survive far into the 18th century both in colloquial and literary use. In the 18th century Pope and other good writers use *was* instead of *were* after *you*, when one person only is addressed. This practice survived in good colloquial use well into the 19th century.

A careful study of the history of English from the earliest times to the present day, based on an intelligent interpretation of the written records of the successive ages, leaves an impression of continuity amid perpetual change. The history of standard English during the last 500 years has been largely one of the varying distribution of elements drawn first from regional, and later from social

dialects. The standards of what is polite and correct shift from age to age. What is vulgar in one generation becomes the pattern of propriety in the next; that which was elegant and habitual to the most refined speakers is felt to be slipshod or worse. There is no doubt that since the early 19th century there has been a great striving after "correctness" in English speech. Our speech to-day is far less untrammelled in its colloquial forms than that of the 17th and 18th centuries. Good speakers then seem to have been content to follow the natural tendencies of unstudied utterance, and were less anxious for "correctness" as this was later understood.

#### The Future of English

This process is still going on, and, with the increased diffusion of education among those who have no traditional knowledge of the best speech, bids fair to alter our language out of all recognition. But other tendencies may arise. It is impossible to foretell the future of English, though we may well believe that it will be no meaner or less splendid than its past. New standards of speech will arise in all probability, with the growth of new centres of culture in this country, and still more in our distant colonies, whose populations are still "mewing their mighty youth," and future historians of spoken English will have to take into account the many varieties of our mother tongue, spoken by peoples of very different experiences and modes of life, throughout the Empire.

#### H. C. K. Wyld

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*LITERATURE.* Anglo-Saxon literature is interesting rather as a document illustrating the spirit of the English stock, Angles and Jutes, than as a direct ancestor of English literature as traced from Chaucer. For modern English literature does not derive directly from Old English literature. From the 11th century, even before the Conquest, to the 14th century, England was a pupil in the school of France. For the greater part of this time Latin was the language of learned, French of polite, literature. For three centuries English and French were jostled together, with the result that when at last in the 14th century English came to its own, it had become the rich composite speech, in vocabulary and syntax, which was to be the medium of English poets from Chaucer to the present time; and in the same centuries, English poets gradually assimilated, adapting it to the genius of the English language, the syllabic, accentual metre which had been first heard in the Latin hymns of the Church and Provençal and French Song.

French literature itself was only beginning when the Normans conquered England, but in the course of the 12th and 13th centuries the French poets of Provence and Gascony, of France proper and of England, created the romantic and lyric literature which is the fountain-head of all modern European literature. The new love-poetry of Provence, with its courtly and ideal, but also conventional, cult of love, the romances of Charlemagne, of Arthur and his Knights, of Troy, Thebes and Alexander, beast-epic and allegory and fabliau—these were made by the French familiar to every country of W. Europe and reproduced in other tongues. In the creation of this courtly literature as such England took no part; but when English literature began to awaken again it was in the reproduction of French themes and forms.

The first English poem written after the Conquest which is really a work of literature, Layamon's *Brut*, is a long and interesting elaboration of that legendary history of Britain, from Brutus to Arthur, which had first taken the shape of history in the *Historia Regum Britanniae* of Geoffrey of Monmouth, and had been already thrown into verse by the Norman

poet Wace. But Layamon makes interesting additions from Welsh oral tradition. The verse is apparently intended to follow the Old English model, but is rapidly approximating to an English reproduction of the French octosyllabic or four foot verse, the long line falling into two parts. Even in religious and didactic works of no great literary merit, the *Ormulum*, the *Bestiary*, etc., we can note the interaction of old English form and feeling with the new influences; but the full effect of French inspiration in the begetting of a new literature, fresh in spirit and in form, is seen in the lyrics and the romances of the 13th and early 14th centuries.

#### Early Lyrics and Romances

The earliest English lyrics, songs like *Sumer is i-cumen in*, *Lenten is come with love to town*, are the work of poets familiar with the French lyric, its rhythms and its tone, gay rather than that of Old English poetry. They blend in humorous fashion lines English, French, and Latin. The same is true of the first English romances, all probably translations, even when, as in *King Horn*, *Havelok the Dane*, *Richard Coeur de Lion*, *Bevis of Hampton*, and *Guy of Warwick*, they deal with native legendary themes. And all the varieties of French romance, Carolingian, e.g. *The Sowdone of Babylon*; Arthurian, e.g. *Lybaeus Desconus*; Oriental, e.g. *King Alisaunder*; classical, e.g. *The Destruction of Troy*; and miscellaneous romances of adventure, e.g. *Ipomydon*, are represented.

All lack the courtly tone of French romance, being composed for popular audiences who love a genially told story of adventure rather than refinement of sentiment. In their diction we see the shaking together of the elements, English, French, and Scandinavian, which make up the rich tongue of Shakespeare and Milton; while in the metrical, not alliterative, poems, we can trace the process by which the syllabic rhythm of French verse was adjusted to the idiosyncracies of stress and cadence in English pronunciation. Outside romance and lyric, poetry of the 13th and early 14th centuries is didactic—the *Cursor Mundi*, a long paraphrase of Scripture history and Church legend; the *Pricke of Conscience*, a summary of theology, erroneously attributed to Richard Rolle of Hampole, a writer of mystical works in Latin and English prose; Robert of Gloucester's verse histories, and other works.

The 14th century witnessed the victory of English over French, in

the schools, the law courts, parliament, and even the court where French still to some extent held its own and French poets found admirers and patrons. In the same century appears an English poetry artistically on a level with the best of France and Italy. The movement to raise the artistic level of poetry took two directions. One was an artificial and abortive attempt to revive and elaborate, with or without the addition of rhyme, the old alliterative verse—a movement which produced the finest of the English romances, *Gawain and the Green Knight*; the beautiful elegiac and symbolic poem, *The Pearl*; and the interesting, if inchoate, satirical, didactic, and mystical poem known as *The Vision of Piers Plowman*, attributed to William Langland, of whom the poem supplies a shadowy outline.

But the future of English poetry lay with those who completed the naturalisation of French poetry, its regular metre, its refined and courtly spirit, its grace and elegance of style. John Gower, after experimenting in a satirical Latin poem, and a tedious didactic poem in French, composed at the close of his life a long poem in English, *Confessio Amantis*, in which he sets in the framework of the confession of a lover to Genius, the priest of Love, a series of stories drawn from many medieval and classical sources and narrated in smooth, equable, well-turned octosyllabic couplets.

#### Spirit of Chaucer's Poetry

Geoffrey Chaucer, however, did more than this. Brought up at court, and sent in later years on missions to various lands, including Italy, Chaucer was educated in the tradition of contemporary French poetry. His earliest poem, *The Book of the Duchess*, is an elegant but jejune dream allegory, a love poem whose incidents are represented as happening in a dream, the characters being personified abstractions. But the majority of Chaucer's extant poems were written after he had made acquaintance with the Italian poetry of Dante, Petrarch, and Boccaccio.

The House of Fame, an incomplete, ironical allegory, shows the influence of Dante in style and incident. The Parliament of Fowls enriched its decorative fabric with borrowings from Boccaccio. Chaucer's first and greatest dramatic story, *Troilus and Criseyde*, is based on the same poet's *Filostrato* with an incident from the *Teseide*. The *Teseide* itself is the source of the chivalrous story of Palamon and Arcite which became the Knight's Tale in *The Canterbury Tales*. The

stories collected in the *Legend of Good Women* are drawn from Ovid and from a couple of Latin works by Boccaccio. The charming Prologue to the poem is Chaucer's own.

But much as Chaucer learned from Italy, the more serious and idealistic spirit of Dante and Petrarch did not pass into his poetry. That transmission was reserved for the 16th century. To the end the spirit of Chaucer's poetry is that of the French love-poetry, allegoric and romantic, qualified by his own bent towards a more realistic and humorous handling of conventional themes. The latter bent achieved its complete emancipation in the Prologue to *The Canterbury Tales*, with its vivid and ironical pictures of all the social types of the England of the 14th century.

#### Chaucer's Successors

Some of the tales themselves are probably earlier compositions, but the best are in the vein of the Prologue, fabliaux, short satiric tales, told with consummate dramatic and poetic art. Only in the fragment of *The Squire's Tale* does the poet reopen the well of pure and enchanting romance. Chaucer gave England a courtly poetry superior in dramatic and poetic interest to the poetry of France. He embellished it with beauties derived from the great Italian poets. He breathed into the whole a spirit entirely English, and in his hands the English language attained to all but the highest perfection of poetical diction and metrical beauty.

Chaucer had no adequate successors for nearly two centuries. John Lydgate and Thomas Occleve kept faintly burning the tradition of didactic allegory and story, and handed on the lamp to its last representative, Stephen Hawes, author, in Henry VII's reign, of *The Pastime of Pleasure*. In Scotland this courtly poetry enjoyed a brighter S. Martin's summer.

The popular literature of the 15th century is of greater interest than the courtly. The religious drama, the mysteries and miracle plays, reached their highest level in the 14th century, and gave place in the 15th to the moralities. To the 15th century probably belong also the oldest of the ballads which, taking the place of the longer lays, preserved the quintessence of the old romances in a way that was to quicken the romantic spirit with surprising and delightful results in later English poetry. Of artistic prose in Middle English, the tentative beginnings may be best studied in Chaucer's translation of Boethius. The 15th century witnessed a fairly steady advance of

prose as an artistic medium whose finest result is the *Morte d'Arthur* of Sir Thomas Malory.

The revival of learning in the 15th century made Italy the centre of influence in literary fashions as definitely as France had been so in the 12th and 13th centuries. That influence came to England in two successive waves—from Italy direct in the reign of Henry VIII. from Italy by way of France in the reign of Elizabeth. Stephen Hawes was still writing dull allegory, and John Skelton was burlesquing the same in individual fashion; the older tradition of amorous and gay songs and carols after the French manner was still in vogue with Henry VIII and his musicians; when Sir Thomas Wyatt and Henry, earl of Surrey, having "tasted the sweet and stately measures and style of Italian poesie," began to cultivate this more dignified and passionate note in sonnets, in irregular imitations of the canzone and other Italian forms, and in songs, all published after their death in Tottel's *Miscellany* (1557).

#### French and Italian Influences

The twenty years which followed was a period of arrested development and of experiment, especially in verse translation from Latin, e.g. Arthur Golding's *Ovid*. The one bright ornament is Thomas Sackville's *Induction* and *Legend of the Duke of Buckingham*, contributed in 1563 to *The Mirror for Magistrates*, which, apart from these poems, was but a dull continuation of Lydgate's moralising "tragedies," and sentimentously narrated stories of the overthrow of great men through the fickleness of fortune.

When the *Shepheards' Calender* of Edmund Spenser appeared in 1579, the artistic influence of Italy and France was reacted upon by the temperament of a people whose national self-consciousness had grown eager and intense, and whose spiritual life was being profoundly modified by that religious Reformation which tended to separate them from the Latin peoples who were their artistic tutors. The result was naturally complex, a literature at once national and exotic, at times Italian in its dissolute moral tone, again already growing Puritan in its moral ardour, rich in felicities and beauties of style and verse, yet abounding in fantastic extravagances.

Spenser's pastoral, *The Shepheards' Calender*, his allegorical romance, *The Faerie Queen* (1590-96), and all his shorter poems, satirical, elegiac, and lyrical,

reveal the influence of French and Italian poetry, of Italian Platonism, of Chaucer and of Sir Thomas Malory; but the spirit which strives to harmonise the whole is that of an Elizabethan Englishman passionately patriotic and Protestant. And if much remains unharmonised, the discords are held in solution by a style diffuse in picture and melody, a verse in which the grave iambic movement of Sackville's *Induction* is heightened by every resource of varied cadence which English metre permits, and adorned with all the accessories of alliteration and vowel-music which English verse welcomes.

Of all the exotic forms naturalised by Wyatt and Surrey, the sonnet enjoyed the greatest popularity in the closing decades of the century. One sequence of love sonnets, after the fashion of Petrarch's *Laura*, followed on another in rapid succession, including Sir Philip Sidney's *Astrophel and Stella*, Samuel Daniel's *Delia*, Michael Drayton's *Idea*, Spenser's *Amoretti*, and the later published *Sonnets of Shakespeare*. The Elizabethan sonnets are largely translations and imitations, and abound in the conventional and extravagant conceits which are common to the kind, while few or none have the exquisite perfection of form which makes Petrarch a classic. But on the best of the English sonnets, as on Michael Angelo's, is set the impression of personality, the insolent gallantry and passion of Sidney, the brooding thought, the self-abnegation in friendship, of Shakespeare.

#### Elizabethan Poetry

The same poets experimented in many kinds, e.g. in the decorative Ovidian idyll, as Marlowe's *Hero and Leander*, Shakespeare's *Venus and Adonis* and *Rape of Lucrece*; and the same overwrought rhetoric characterises Daniel's *Rosamund*, a continuation of the *Mirror for Magistrates* type of story, and Drayton's antithetic imitations of *Ovid's Heriodes*, imaginary love-letters in verse, England's *Heroical Epistles*. But Daniel and Drayton cultivated a severer style in their historical poems, suggested by Lucan's *Pharsalia*, Daniel's *Civil Wars* between York and Lancaster, and Drayton's *Barons' Wars*.

Daniel, George Chapman, Drayton, Sir John Davies, author of *Orchestra* and *Nosce Teipsum*, John Donne, Sir Henry Wotton, and others cultivated a grave philosophical poetry, frequently epistolary in form, in which Stoicism and Christianity are blended. Distinctively religious

poetry, whether Roman Catholic, like Robert Southwell's *St. Peter's Complaint* and Henry Constable's *Spiritual Sonnets*, or Protestant, like Joshua Sylvester's translation of *Du Bartas' Divine Weeks and Works*, shows the same elaboration of style and sentiment. The crown of Elizabethan verse translations are George Chapman's *Iliad* and *Odyssey*.

The greatest and happiest work was achieved in drama and song. In the closing decades of the century a new impetus was given to song writing by the study of lute music and the coloured, cadenced lyric of the French renaissance poets, Ronsard and his fellows, with the result that a lyric of many moods, and a new wealth of imagery and harmony, adorned romance and drama, or was garnered in song-books and anthologies such as England's *Helicon* and Davison's *Poetical Rhapsody*. Songs were composed by all the poets of the day, and many of the most charming are anonymous.

#### Growth of the Drama

The drama is a larger subject, and its history in the 16th century is one of shifting and confusing development, of overlapping kinds, of natural evolution crossed and disturbed and directed by extraneous influence. The Morality, which had produced in the later 15th century such a fine flower of serious drama as *Everyman*, was responsible in the 16th for the impressive *Cradle of Security*. Farce of a realistic kind—thumb-nail sketches of low life in London—mingles with the serious element, especially in *Moralities* dealing with the follies of youth.

The general tendency of the Morality is to be dull, and this was intensified by the Renaissance schoolmaster's love for the didactic, as in John Rastell's *Interlude of the Four Elements*, by such political allegory as *Lord Governance*, and by the Reformation passion for polemic, as in John Bale's *The Three Laws*, etc., *Lusty Juventus*, *Respublica*, and others. Queen Elizabeth checked this intrusion into controversy. The same Bale's *Kyng Johan* and a play like Thomas Preston's *King Cambyses*, or the weird version of Aeschylus's great story, *Horestes*, show how Morality blended with story and developed into the characteristically Elizabethan product, the story play, serious or farcical, or more commonly a blend of both.

Classical influence made itself felt, here as in other countries, in attempts to reproduce the exact

form and features of Seneca's Latin tragedies, *e.g.* in Sackville's *Gorboduc*, and of Latin comedy, *e.g.* Nicholas Udell's *Ralph Roister Doister*. The attempt miscarried, and the dominant type of play of the '60's and '70's was the story-play, the play which brought on the stage all the crowded incidents, dramatic and undramatic, of a story drawn from any and every source, with little interest of character and no beauty of style. The artistic, refining effect of classical and Italian influence made itself felt when into these story-plays was breathed something of the spirit of ancient comedy and tragedy, and they were clothed in a new beauty of form, prose and verse.

#### Marlowe and Shakespeare

John Lyly led the way in the reform of the drama as literature with his light and graceful, if flimsy, mythological and courtly comedies. George Peele sweetened the versification and brightened the fancy of comedy and romance, and Robert Greene is mainly responsible for the woodland settings and the fair maidens of Shakespeare's *As You Like it* and *Twelfth Night*. Thomas Kyd achieved a success by his *Spanish Tragedy*, which popularised the melodramatic revenge-motive and the stilted rhetoric of Seneca, while eliminating the choruses and loosening the structure. But the great forerunner of Shakespeare was Christopher Marlowe (*Tamburlaine*, *Dr. Faustus*, *Edward II.*), who gave to serious English drama stateliness and splendour of form, while quickening within it the soul of dramatic interest. His blank verse is the overture to the fuller, more varied harmonies of Shakespeare and Milton.

In William Shakespeare a great tradition found its fullest expression. The statue had been blocked out, the tools were ready to his hand. It was no restraint to him, it seems rather to have been a help, to revise older work, to collaborate with lesser men. But the miracle of genius remains. The tradition broke into a new life in his hands. The old play, the lesser dramatist, found through him their fulfilment. He neither led nor followed, he moved instinctively with the changing currents of taste. His early tragic histories, *Henry VI* and *Richard III.*, are Marlowesque in spirit and style; his early comedies and romances, *Love's Labour's Lost*, and *A Midsummer Night's Dream*, absorbed and enriched all the currents that flowed more faintly in Lyly and

Peele and Greene. As the century draws to an end he satirises the bombast of Marlowe and Kyd through *Ancient Pistol*, and Lyly's Euphuism in the wit of *Falstaff*, and blends heroic history, full of the same spirit as Daniel's and Drayton's *Chronicle poems*, with genial and boisterous comedy.

And when Jonson turned drama from romance to realism, Shakespeare passed to tragedy, tragedies of character and adverse stars in *Hamlet* and *Julius Caesar*, tragedies of great souls driven from their orbit by passion to clash and destroy and perish in *Othello* and *Lear*, and the style and imagery and verse change with the change of theme. Lastly, when Beaumont and Fletcher revive the flutings and falsetto of romance, Shakespeare, too, turns back to the charm of romantic setting and pathetic lovers and children and flowers and poetry and reconciliation. He works with all his fellows, but gives to each kind of play an infinitely richer dramatic and poetic worth.

English prose in the 16th century felt the influence of Latin in vocabulary and structure. The prose of the 16th century—of John Fisher, Thomas Elyot, Roger Ascham, Thomas North, and others—is a happy blend of simple, direct, colloquial English, with a free importation of Latin words and a sentence shaping towards the Latin period. The finest product of this are the translations of the Bible, from Tyndale to the Authorised Version, a book which has shaped and coloured, as perhaps no other, the diction and rhythm of the best English prose and verse.

#### Hooker and English Prose

For the last two decades of the century prose, like verse, came under the influence of the taste for elaborate rhetoric. Lyly's *Euphuism* set the fashion of antithesis, alliteration, and artificial simile for a succession of imitators in novels and pamphlets, Robert Greene, Thomas Lodge, Thomas Nash, and Thomas Dekker; though in Nash and Dekker a racy colloquialism blended with and superseded the tricks of *Euphuism*. Sidney cultivated a more poetical rhetoric in his *Arcadia*, and, with much less of artifice, in the *Defence of Poesie*. Richard Hooker, in the *Ecclesiastical Polity*, raised the Latinised, periodic prose to a higher level of rhythm, and dignified eloquence, and made English a fitting medium for philosophical disquisition.

The literature of the earlier 17th century is as varied in character as that of the 16th. The first fifteen

years witnessed the culminating achievement of the drama in Shakespeare's great tragedies and the sombre, extravagant, but impressive work of Marston, Chapman, Middleton, and Webster, and in the sardonic, unromantic "humours" comedy of Ben Jonson and his classical tragedies. In the work of Beaumont and Fletcher, Massinger and Ford, Shirley, and smaller men, we study the setting of a brilliant day in a sky rich in the colours of sentiment and phrasing.

#### John Donne and Ben Jonson

In poetry Spenser found no follower in the endeavour to revive, and give a new significance to, the chivalry of medieval romance, though Ariosto and Tasso were translated by Sir John Harrington and Edward Fairfax. But Spenser's pastoralism was variously tuned by many poets, as William Browne, *Britannia's Pastorals*; and Drayton, *The Muses' Elizium*; and the Scottish Drummond of Hawthornden, a late Elizabethan, in his *Italianism* and his love for sonnets and pastorals. The didactic, allegorical, religious aspect of Spenser's work appealed more strongly than the romantic and chivalrous to ardent Protestants like the poet brothers Giles Fletcher (*Christ's Victory and Triumph*) and Phineas (*The Purple Island*).

None, however, of these overflows from Elizabethan poetry, modified by the changing spirit of the time, represents quite clearly the two main directions in which literature moved during the century, on the one hand towards an increasing weight and fullness of thought and conceit, to which is sacrificed grace and beauty of form and verse, on the other towards more definiteness, uniformity, and correctness of style and verse. The dominant influences in this two-fold movement are the late Elizabethan poets, John Donne and Ben Jonson. The poems, erotic, satirical, complimentary, and religious, of the former fascinated all the younger, bolder spirits by their intellectual subtleties and passionate perversities of feeling, their rugged strength and frequent felicities of phrase, their contemptuous violations of smoothness and sweetness in versification with the deep and plangent harmonies which none the less they repeatedly achieve.

Ben Jonson, in his songs and epigrams and odes and verses, complimentary and satirical, combines the same compacted pregnancy of thought with a constant, though not always successful, striving after



classical definiteness of form, classical finish, and felicity of phrasing. The influence of both is obvious in English poetry to the time of Cowley and Dryden. Jonson's and Donne's best disciples are the courtly lyricists, Thomas Carew, Richard Lovelace, John Suckling, Thomas Stanley, and a host of others down to the earl of Dorset, the earl of Rochester, Charles Sedley, Aphra Behn, and John Dryden himself in the years after the Restoration. The greatest of them, as artist and poet, is Robert Herrick, the greatest Epicurean and fanciful songwriter in our literature. The influence of Donne, his metaphysical wit and his passionate egotism, is most directly traceable in the religious poets, Anglican and Catholic—George Herbert, *The Temple*; Henry Vaughan, *Silex Scintillans*; Richard Crashaw, *Steps to the Temple*, and *Carmen Deo Nostro*; in Thomas Traherne, and others. But, together with Donne's influence, that of Italian religious poetry, with its sugared conceits and the mysticism of Spanish writers, as S. Theresa and John of the Cross, can be recognized.

#### The Poetry of Milton

The greatest of seventeenth century poets, John Milton, shares the taste of his age for compacted thought and multifarious learning while despising its fantastic and metaphysical conceits. In his poetry, Ben Jonson's ideal of classical form and finish is ministered to by a finer ear and by a poetic temperament and imagination as spontaneously creative as those of the greatest Elizabethans. The early Cambridge and Horton poems, the *Nativity Ode*, *At a Solemn Music*, *On Time*, *L'Allegro* and *Il Penseroso*, *Arcades*, *On the Marchioness of Winchester*, *Comus*, *Lycidas*, combine the spontaneity, fancy, and ravishing music of Spenser and Shakespeare with a consciously elaborated art, architectonical, stylistic, and metrical, which, on this scale, was a new thing, and has never been surpassed in the history of English poetry.

*Paradise Lost* is built from the stern experiences and the rigid political theology of the years of rebellion and pamphleteering. The freshness and charm of the earlier poems are gone, but their loss is compensated for by grandeur of epic creation in incident, character, and setting, and by the most majestic and harmoniously modulated blank verse which English ears have ever heard. *Paradise Regained* is a paler reflex of these qualities, but into *Samson Agonistes*, Milton's experiment in classical tragedy, he poured the passion of his own

sufferings and the defeat of his cause, the pride of his defiant will, clothing them in words and measures as sublime as they are severe.

But the movement towards classification, definiteness, and perfection which fulfilled itself so strikingly in Milton followed a line of less resistance in the work of Edmund Waller, John Beaumont, John Denham, William Davenant, and Abraham Cowley. In Cowley's *Mistress* and *Pindarique Odes* and *David's* the extravagances of the earlier period are made the more obvious by the subsidence of the imaginative passion which in Donne inspired and condoned for these; but the common aim of the others, conscious or unconscious, was the rejection of this extravagance, the limitation of the pattern which verse might follow, and the exaction of a higher degree of correctness within that pattern.

The movement was carried to a triumphant success by John Dryden, a far inferior poet to Milton, but the first and among the most accomplished of English men of letters—dramatist; poet, eulogistic, lyrical, satirical, and didactic; translator; literary critic; and essayist. In Dryden's verse and prose the English language is written as we still use it; he is our first modern. His satires, as *Abalom* and *Achitophel*, and didactics, as *Religio Laici*, *The Hind and the Panther*, are an idealised reflection in verse of easy, masculine conversation or eloquence. His odes are our supreme examples of lyrics in which there is not a note of song but all is artfully managed noise and declamation. Working within a still more limited pattern, Alexander Pope achieved, in the next generation, a yet higher degree of pointed and polished perfection.

#### Dryden and Pope

Nothing can surpass in its own way the eloquence of *Eloisa* to *Abe-lard*, the satirical miniature-painting of *The Rape of the Lock*, the aphorisms and declamations of the *Essays on Criticism* and *Essay on Man*, the condensed, polished, poisonous satire of the *Dunciad*, *Moral Essays*, and *Imitations of Horace*. Dryden and Pope are the high priests of a school of poets including *Prior* and *Gay* among their contemporaries and a succession of elegant, conventional poets, continued to the end of the century and beyond, whose work may be studied in a collection like *Dodsley's*.

The Restoration drama of England is represented by the high-flown and absurd, but eloquent, heroic plays of Dryden, the path-

etic, rhetorical tragedies of Nathaniel Lee and Thomas Otway, the brilliant, polite, licentious comedy of George Etherege, George Farquhar, William Wycherley, John Vanbrugh, and especially William Congreve. Thereafter, except for brief intervals, as in the plays of Goldsmith and Sheridan and the drama of our own day, the acted drama has not formed an important section of English literature, although almost every poet, Addison, Thomson, Gray, Wordsworth, Coleridge, Byron, Shelley, etc., has tried his hand at poetic drama, Elizabethan or classical.

#### Development of English Prose

The same idea of uniformity, of a definite but not too rigid pattern, "correctness," shaped the prose of Dryden, Temple, and their followers. The earlier prose of the 17th century had shared in the irregular greatness of the poetry. The prose of Francis Bacon's *Essays*, and *History of Henry VII*; of the great Anglican preachers, Lancelot Andrewes, John Donne, poet in prose as well as verse, Jeremy Taylor; of philosophical humorists as Robert Burton, *The Anatomy of Melancholy*, Thomas Browne, *Religio Medici*, and *Urn Burial*; the controversial pamphlets of Milton, as *Areopagitica*; the historical memoir-writing of Clarendon, *History of the Rebellion*—all illustrate the erudite, imaginative phraseology, the splendid but not perfectly controlled harmony, the too long and complex sentence-structure of a prose which enriched our language, but was not a fully developed and controlled medium.

A simpler style is traceable in the antithetic sentences of the character-writers, as Earle's *Microcosmographie*; the prose of moderate divines like Chillingworth, *The Religion of Protestants*, and Hales, *Golden Remains*; and the virile, well-girt style of the philosopher Hobbes, *Leviathan*. The strain of racy colloquialism in 17th century prose, coloured by a sensitive and imaginative temperament, and enriched by the sublimar phraseology of the English Bible, gives individuality to the *Grace Abounding* to the Chief of Sinners and *Pilgrim's Progress* of John Bunyan. A gentler temper sweetens the talkative prose of Izaak Walton's *Compleat Angler*, and *Lives*, and the multifarious, witty writings of Thomas Fuller. The new prose, colloquial but urbane and weighty, begins in the *Sermons of Tillotson* and South, the *Essays of Sir William Temple*, and, above all, in the prefaces and essays of John Dryden, whose



critical prefaces manifest. for the first time, the qualities of urbanity, of ease and elegance combined with force, which mark the prose of a people who have come of age socially and culturally.

The new instrument lent itself to all the purposes of an age in which political and social life entered into the closest union with literature. The first of these is satire; and the pamphlets and occasional pieces of Jonathan Swift, from *The Tale of a Tub* to the *Travels* by Lemuel Gulliver, made him a power in English political life, and revealed the greatest mastery of irony in the English or perhaps any other tongue. Richard Steele and Joseph Addison, pamphleteers on the other side from Swift, showed in *The Tatler* and *The Spectator* how the same style, used with less masculine vigour than in Dryden's, and less incisive virulence than in Swift's prose, but with a delightful blend of irony and "sweet reasonableness," might be made to inculcate good sense and purer manners on a society which still felt the evil effects of Puritan and Restoration excesses. The *Tatler* and *The Spectator* had many successors down to the end of the century, including *The Guardian* and Johnson's *Rambler* and *Idler*.

#### Birth of the Modern Novel

The first of modern novels in Western Europe was Cervantes' *Don Quixote*, whose fame was quickly diffused. The most interesting precursors of the novel in English were such varied products as the picaresque and sentimental extravagances of Aphra Behn's *Oroonoko* and *The Forced Marriage*; Bunyan's realistic allegories; Daniel Defoe's stories, which are almost the complete thing, e.g. *Robinson Crusoe*, *Captain Singleton*, *Moll Flanders*, *Captain Jack*; and the fantastic realism of Jonathan Swift's *Gulliver's Travels*. But a potent shaping influence was that of the press, which, beginning in the reign of James I, had developed in the *News Books*, *Mercuries*, etc., of the Civil Wars, the last phase of which was the *Newsletters* of Henry Muddiman and the fuller journalistic work of John Dunton and Daniel Defoe.

The man in whose work these various elements—realistic narrative, the minute portrayal of contemporary life and manners, the didactic interest in conduct—crystallised, finding their centre in the sympathetic analysis of a human soul passing through a moral crisis, was Samuel Richardson, whose *Pamela*, *Clarissa*, and *Sir Charles Grandison* created a type of novel

which has been more assiduously cultivated in France than in England. A different kind of plot, deriving from *Don Quixote*, full of adventures at inns, bringing together all sorts and conditions of men, a more masculine philosophy of life and conduct, made Henry Fielding, dramatist, essayist, and novelist, the father of a novel more characteristically English than that of Richardson. Joseph Andrews, *Jonathan Wild*, *Tom Jones*, and *Amelia* are the most genial and vivid pictures of English life which the 18th century has bequeathed.

#### Smollett and Goldsmith

He was followed by an ill-conditioned Scot of genius, Tobias Smollett, a sardonic and angry painter of sordid and violent life, the creator of some immortal types, as of the English sailor, in *Roderick Random*, *Peregrine Pickle*, and *Humphrey Clinker*. The tendency of the novel in Smollett's hands to revert to picaresque story was checked by Laurence Sterne, whose self-conscious sentiment and whimsical humour, which owed much to Rabelais, Montaigne, Cervantes, Burton, and Swift, found expression in *The Life and Opinions of Tristram Shandy, Gent.*, and the *Sentimental Journey*, a tour through France and Italy, tales which, following no plan, vindicated the right of the novel to take what form it please, so it mirror the idiosyncrasies of character and feeling. Among the followers of these great painters of manners is Frances Burney, with *Evelina*, *Cecilia*, and *Camilla*, while Johnson's *Rasselas* is but an expanded epilogue of the type of Addison's *Vision of Mirza*. Goldsmith's *The Vicar of Wakefield*, with its fanciful, humorous, pathetic picture of life seen through the idealising atmosphere of reminiscence, had an influence on Goethe and Continental writers hardly inferior to that of Richardson. In Horace Walpole's *Castle of Otranto* the first wave of the Gothic revival reached the novel.

The novel was only one channel of prose literature in the century. If the didactic spirit invaded and chilled poetry, the regard for form, for correctness, elegance and dignity of composition, gave artistic interest to work of kinds which a later age has too scrupulously divorced from literature. John Locke, *Essay concerning Human Understanding*, was a diffuse and cumbersome writer; but there are few finer practitioners in the prose of Dryden and Addison than George Berkeley, *Three Dialogues*, *Alciphron*, and David Hume, *Essays*. Johnson, poet, lexicographer, essayist, and critic, sacrificed the

lightness of Addisonian style for more force and dignity, not untouched with pomposity, qualities not more evident in his own work than in the record of his conversation preserved in James Boswell's *immortal Life*.

English prose acquires grace and charm in the work of Oliver Goldsmith, whose *Citizen of the World*, *Vicar of Wakefield*, and comedies have an undying freshness. Edward Gibbon made the same dignified prose the purple vestment of his not more learned than splendidly ordered *Decline and Fall of the Roman Empire*. Edmund Burke, the most diffuse and gorgeous of English orators, combined with eloquence a unique intellectual and imaginative insight into the principles of politics, the mainsprings of man's social nature.

A didactic purpose, a regard for "correctness" within a narrow but widening pattern of diction and verse, are the accepted principles of English poetry to the time of Blake and Wordsworth, and even later. The beginnings of a change showed themselves first rather in an enlarged choice of subjects—Nature, the Middle Ages, Liberty, and the Natural as opposed to Civilized Man, and in some experiments in earlier verse forms, than in any radical change of spirit and style.

#### Augustan Conventions

James Thomson's blank-verse *Seasons*; John Dyer's octosyllabic *Granger Hill*; the essays in *Spenserians*, as Thomson's *Castle of Indolence*; Thomas Gray's pensive *Ode on a Distant Prospect of Eton College*, or *Elegy in a Country Churchyard*; and the equally pensive, less finished and sustained, but more spontaneous and sensitive odes of William Collins: the minor poetry of the Wartons, Thomas and Joseph, and of Mark Akenside; the poems, more Pope-like in form, of Dr. Johnson, as *The Vanity of Human Wishes*; Oliver Goldsmith's *The Deserted Village*, and George Crabbe's *The Village*, all show in different ways the change that is being effected, but are still quite Augustan in their conventional "poetic diction," their studied "correctness" in spirit and form; and so, despite their romantic themes, are Gray's more ambitious odes. *The Progress of Poesy* and *The Bard*.

But the new spirit was to find its proper style, to substitute for a poetic heightening of eloquence a style whose ideal is the free and natural outpouring of the heart. The frost is loosening in the poetic prose of Macpherson's *Ossian*, and

Chatterton's Rowley Poems, in Goldsmith, and in Cowper's The Task. It is broken up in the songs of William Blake, mystical poet and painter, Songs of Innocence, Songs of Experience, and in the Lyrical Ballads of Wordsworth and Coleridge.

The long poetical career of William Wordsworth was run in the fervour of imaginative and mystical insight into the life of nature and its significance for the soul of man, to which he had attained through the meditative country life of his youth and the spiritual agitations of the French Revolution. The Prelude, The Excursion, The Recluse, fragments of a never-completed autobiography and spiritual creed in blank verse; lyrical and narrative poems inspired by nature, childhood, the peasant, the affections, patriotic sonnets, have one common theme, and are composed in a style which Wordsworth was disposed to make something of a religion too—bald and prosaic and even awkwardly pompous when inspiration fails, at its best unique in passionate, imaginative simplicity. Coleridge's best poetry shows the influence of Wordsworth in thought and feeling and style, but what is most individual in The Ancient Mariner, Christabel, Kubla Khan, is not these Wordsworthian qualities, but the magic with which the reawakened sense of beauty and mystery is expressed in phrase and in subtle music of vowel and consonant and cadence.

#### Poetry of Scott and Byron

The spirit and art of Wordsworth's and Coleridge's poetry were too novel and elusive for immediate appreciation. Public taste had to be stimulated and purged by the more crudely romantic poetry of Walter Scott, Byron, and Thomas Moore. Scott's stirring but somewhat rococo lays are of less pure poetic worth than the delightful snatches of song in which he revived the impersonal, chivalrous note of medieval lyric. The fiery, brilliant, crude improvisations of Byron in lyric and lay, and the blend of description and rhapsody in Childe Harold are the unreflective, potent expression of the spirit of pure revolt in romanticism, but Byron's best work was satire in conversational style and *ottava rima*, Beppo, Don Juan, and The Vision of Judgment.

Scott and Byron enjoyed a European reputation. They are the most human and worldly of the poets of the period; there is more passionate flesh and blood in Byron's technically inferior work than in the work of any of our poets

save Shakespeare and Burns. The "desire of the moth for the star" is the burden of the lyrical dramas, Prometheus Unbound and Hellas, rhapsodies as Alastor, and elegiac poems as Adonais, and the songs in winged and ethereal rhythms of Percy Bysshe Shelley. Beauty, the beauties of nature, of Spenser's poems, of medieval chivalry, of Greek mythology and art, of Miltonic cadences and Shakespearean phrases, are the theme and inspiration of the Endymion and later poems and odes of John Keats. The curiously carved Gebir, Helenics and Lyrics of Walter Savage Landor are inspired by a like sense of the statuesque beauties of Greek poems and epigrams and by a finer scholarship, if a less spontaneous creative genius.

#### The Revolutionary Novel

The last great novelist in the 18th century school of manners and character was Jane Austen, whose Northanger Abbey was an early skit on the new romantic novel. Her exquisite pictures of genteel English life in the country and at Bath include Pride and Prejudice, Emma, and Persuasion. But the novel, too, came under the influence of the taste for romantic scenery, a medieval atmosphere, the marvellous and mysterious, dreams of the perfectibility of human nature and political regeneration. The result is seen in revolutionary novels as William Godwin's Caleb Williams; didactic stories like Thomas Day's Sandford and Merton and Miss Edgeworth's tales; Mrs. Radcliffe's tales of mysterious adventures, The Mysteries of Udolpho; crude experiments in historical fiction as Longsword, Earl of Salisbury, Clare Reeve's The Old English Baron, Jane Porter's The Scottish Chiefs. Maria Edgeworth's Castle Rackrent and other tales extended the study of manners to the Irish gentry and peasants.

These and the historical stories are interesting now only or mainly as marshalling the way to the great achievement in the Waverley Novels, from Waverley to Count Robert of Paris, of Sir Walter Scott, who combined and harmonised the interest in character and manners of the great 18th century novelists, the romantic passion for other times and other manners and for a picturesque setting in scenery rich in historical associations, and that respect and affection for the peasantry which had grown steadily throughout the 18th century from Thomson and Gray to Rousseau and Burns and Wordsworth.

The influence of the romantic

movement on prose work other than the novel can be studied in the picturesque, archaically coloured prose essays and Elizabethan critical studies of Charles Lamb, Essays of Elia, Specimens from the Dramatic Poets; in the vivid, passionate, impressionistic essays and criticism of William Hazlitt, Lectures on the English Poets, Lectures on the English Comic Writers; in the cadenced prose, musical and fanciful, of Thomas De Quincey, The Confessions of an Opium Eater; and in the pleasant chat about letters and art and scenery of Leigh Hunt, The Examiner, etc. William Cobbett's racy, idiomatic prose, Rural Rides, continues the tradition of South and Swift.

The poetry of the reign of Queen Victoria is a continuation and elaboration of the romantic revival. The chief themes are the same—Nature, the romantic past, medieval and classical, the problems of life and death. There is less of the suggestion of a prophetic burden (that is taken over by prose writers like Carlyle and Ruskin) than in Wordsworth and Shelley, more of consciously artistic handling, of antiquarian accuracy of reproduction, of analysis and inquiry, of dramatic interest which, except in Scott, had been somewhat overshadowed by the large topics—Nature and Liberty and Romance. The purification of style, the rejection of a stereotyped convention in poetic diction, had led to an enrichment of phraseology, a more imaginative style that owes much to older poets, and in the elaboration of which Keats is a principal agent, and Keats's influence is obvious in all the Victorians.

#### Tennyson and Browning

The most representative poet is Alfred Tennyson, whose careful experiments in the artistic expression of moods culminated in the two volumes of 1842, lyrics and idylls of nature and English rural life, of character, Simon Stylites and Ulysses, of medieval and classical legend, and of the problems of sin and death and immortality, The Vision of Sin. In the years which followed the style thus studied and mastered became the medium of longer, more ambitious, not always entirely successful poems, The Princess, In Memoriam, Idylls of the King, jewelled settings of tales from Malory and the Mabinogion, touched with modern feeling. Tennyson's later ballads and idylls reflect with great but unequal power his passionate patriotism and the trouble of soul with which he contemplated the changing spirit of his age.

A wider dramatic range, a more curiously analytic mind, a more colloquial style, and a less melodious but more varied verse distinguish the not essentially different dramatic monologues and lyrics of Robert Browning. The long and somewhat chaotic and obscure poems, of which the happiest is *Paracelsus*, were followed by experiments in dramas intended to be acted (as some were), and then Browning found himself in a series of shorter dramatic lyrics and monologues, beginning with *Pippa Passes* and closing with *Dramatis Personae*. The longest of his dramatic, analytic studies of the human soul, *The Ring and the Book*, was followed by many similar studies, subtly intellectual but more fitfully inspired.

As a revival of the life and art and spirit of past times the movement which began in the 18th century culminated in the exotic, cultured poetry of the middle of the 19th century. But this poetry also reflects that change of spiritual temper which troubled Tennyson and Browning, on the one hand the revival, actual or artistic, of mediæval Catholicism, on the other the Lucretian philosophy of life to which modern science tended.

#### Learning and Lyrical Inspiration

In this philosophy, in the poetry of Greece, in Goethe and Wordsworth, Matthew Arnold found the inspiration of poems, lyrical, narrative, and in Greek dramatic form, with a piercing elegiac note of their own. Mediæval art, early Italian poetry, Keats and Browning were the influences which shaped and coloured the ballads, monologues, sonnets, and lyrics, sensuous, mystical, and elaborate, of Dante Gabriel Rossetti. Early French poetry, Froissart and Chaucer, Rossetti and Browning, the architecture and decorative arts of the 12th and 13th centuries, the passionate, stoical heroism of Icelandic myth and saga, a socialism which is in part an artist's hatred of modern machinery and commerce, are the blended strains in the lyrical and narrative poetry and prose of William Morris, reteller of stories classical and northern after the manner of Chaucer, but without his humour.

A deeper sympathetic comprehension of the spirit, but even more of the form, the metrical complexities and beauties, of Greek poetry, superior to that of Gray, perhaps even of Milton, for Milton was limited by the scholarship, more Latin than Greek, of his day; an equally intimate know-

ledge and understanding of French poetry from Villon to Victor Hugo; a love amounting to idolatry for Shakespeare and the Elizabethan dramatists—are the sources of the poetry, decorative and intoxicatingly harmonious, of Algernon Charles Swinburne. Never have learning and lyrical inspiration been more strangely blended; never has poetry so spontaneously lyrical been so purely literary in its sources and motives.

#### Old Forms and Modern Feeling

To this school belongs the intimate, ascetic, religious poetry of Christina Rossetti; and one of the most remarkable products of the tendency to find inspiration in the past and adapt old forms to modern feeling is Edward Fitzgerald's *Rubaiyat of Omar Khayyam*. There is no room here to speak of lesser work, as Keble's *The Christian Year*, the *Lays of Lord Macaulay*, the *Festus* of Bailey, the poetry of Taylor, Alexander Smith, Sidney Dobell, and Arthur O'Shaughnessy, or the lighter verse of William Edmonstone Aytoun, C. S. Calverley, and Lewis Carroll.

Among the many prose writers other than novelists of the early and middle century, historians like George Grote, *History of Greece*; Lord Macaulay, *Essays, History of England*; James Anthony Froude, *History of England*; philosophers as John Stuart Mill, *Logic*, *On Liberty*, *Utilitarianism*; and Herbert Spencer, *Principles of Psychology*, *First Principles*; theologians and religious writers as John Henry Newman, *Apologia pro Vita Sua*, *Grammar of Assent*; critics of literature and art as Matthew Arnold, *Essays on Criticism*; and Walter Pater, *Studies in the History of the Renaissance*, *Marius the Epicurean*, *Appreciations*, two stand out most vividly. The first is Thomas Carlyle, the tormented, passionate, eloquent prophet of duty and work, whose Sartor Resartus is at once a spiritual autobiography and a philosophy, following Swift and Burke, of the clothes, political and religious, in which the human spirit is ever concealing its "shivering nakedness," only to find them grow old and drop away, if not burnt up in Protestant Reformation and French Revolution, and to begin again to weave them in time's tireless loom.

In the French Revolution Carlyle portrayed, with an amazing vividness of dramatic and cinematographic presentation, an era of dissolution and rebirth, the flaming apparition of modern democracy.

In *Heroes and Hero-worship*, *Cromwell's Letters and Speeches*, and *History of Frederick II*, he dilated upon and dramatically reconstructed some of those great spirits who, penetrating to the reality which underlies the illusions of life, are the true leaders of men.

The reference to current events which runs through all his work found clearest expression in *Chartism Past and Present*, and *Latter Day Pamphlets*. The other Victorian prophet is John Ruskin, the more musically eloquent expounder of art, painting and architecture, in its relation to the moral nature of man and the ordering of society. Modern Painters, *Seven Lamps of Architecture*, *Stones of Venice*, *Unto this Last*, *Sesame and Lilies*, *Fors Clavigera*, *Preterita* are among the principal works which brought art into a closer relation with literature than had ever been done before in England, and trace the troubled progress of a great and sensitive soul. A less prophetic but equally prejudiced and individual writer of the period was George Borrow, the first interpreter of the Gipsy character, and a writer of natural, racy prose, *Lavengro*, and *The Romany Rye*.

#### Dickens and Thackeray

The Victorian novel resumed with certain definite limitations imposed upon it by the moral taste of the time, the work of the great 18th century novel, the serious and humorous portrayal and the active criticism of contemporary life and manners, with occasional digressions into the historical. Charles Dickens, humorist, sentimentalist, pictorial describer and dramatic, not to say melodramatic, narrator, social critic and reformer, began with *The Pickwick Papers* a series of novels and tales that enthralled the readers of the world. The greatest are probably *Pickwick*, *Nicholas Nickleby*, *Martin Chuzzlewit*, *David Copperfield*, and *Great Expectations*. *Barnaby Rudge* and *A Tale of Two Cities* are historical novels, the latter coloured by the reading of Carlyle's French Revolution. Dickens's favourite subject was the character and manners of the lower middle classes.

But the most penetrating critic of the devastating snobbishness of English upper class society, never worse than at this time, when wealthy merchants were pressing for aristocratic recognition, was William Makepeace Thackeray, the most unerring portrayer since Fielding of human nature as it is,

the novelist who gives us no heroes. *Vanity Fair*, *Pendennis*, and *The Newcomes* are, with his shorter sketches, the greatest of his novels of contemporary life. In *Esmond*, and in a lesser degree in its sequel *The Virginians*, the same delicacy of satirical and sympathetic portraiture is given an historical setting of wonderful comprehensiveness and atmosphere. The early sketches of provincial life by George Eliot (*Marian Evans*), *Scenes from Clerical Life*, *Adam Bede*, *The Mill on the Floss*, *Silas Marner*, and *Felix Holt*, have a freshness and power that somewhat failed her in the later more learned and philosophical works, *Romola*, *Daniel Deronda*.

The tendency to make of the novel a political, social or ethical and religious pamphlet, which is obvious in Dickens's works, though constantly transcended by his buoyant humour and creative power, is dominant in the brilliant political novels of Benjamin Disraeli, *Coningsby*, *Sybil*, *Tancred*, *Lothair*, and *Endymion*; in the ardent and vivid pictures of contemporary and past problems and agitations of Charles Kingsley, *Alton Locke*, *Hypatia*, *Westward Ho*, and *Hereward*; and in the stories of Mrs. Gaskell. The Brontë sisters, Charlotte and Emily, poured into the same form, *Jane Eyre*, *Villette*, *Wuthering Heights*, the lyrical record of their own lives and passionate thoughts. Anthony Trollope, with his delightful sketches of clerical society, *Barchester Towers*, *Framley Parsonage*; Charles Reade, ardent social reformer, *It Is Never Too Late to Mend*, *The Cloister and the Hearth*; and Lord Lytton, experimenter in all kinds of novels, *The Caxtons*, *My Novel*, *The Last Days of Pompeii*, *A Strange Story*, are typical Victorian novelists.

#### George Meredith and Thomas Hardy

Of the later Victorian writers and their followers four have been most influential; of the older men George Meredith and Thomas Hardy, novelists and poets, whose influence to-day is greater than in the heyday of their productivity; Robert Louis Stevenson, essayist, novelist, and poet; Rudyard Kipling, story-teller and poet—younger men, whose influence was more immediate, and probably more ephemeral; for the older men were more prophetic of the main movement of thought and literature. They turned their back on the romantic reconstruction of earlier ages, the self-conscious revival of artistic fashions and forms.

Their primary concern is with nature and life seen through eyes that are cleared of the beliefs and

prejudices, religious and ethical, which formed the background of English literature from Chaucer to Tennyson and Browning, but in the course of the 19th century had been in process of disintegration or reconstruction. They re-interpret life for themselves in the light of Darwinian science. Meredith's poems, *Modern Love*, *A Reading of Earth*, and novels, *The Egoist*, *Richard Feverel*, etc., preach a stern, harsh lesson—of nature's harsh, inevitable discipline, whose finest flower is the intelligence of man. In his style subtle analysis, grotesque wit, and poetical metaphor combine and obscure by their brilliance; his verse is a blend of wonderful felicities of phrase and rhythm with painful obscurities, incongruities, and harshness.

#### Great Analysts of the Human Soul

Thomas Hardy depicts in language of quiet clarity and beauty the rural and urban life of "Wessex," Dorsetshire and surrounding country, which had already found an interpreter in the dialect poems of William Barnes. His theme is, like Meredith's, man and nature, their mutual interaction, their significance as factors of one problem, but Hardy dwells on failure rather than on conflict, on the strange, ironic, tragic circumstances of which men and women are the helpless victims, the sport of the Immortals with Tess and Jude; and the chorus to his tragedy is the homely, resigned, quaintly humorous peasantry of his chosen district.

Hardy's poems, and the *Dynasts*, are instinct with the same spirit, the same sensitive appreciation of the tears in human things, be it an individual life or the destinies of nations. Far from the Madding Crowd, *The Woodlanders*, *The Return of the Native*, Tess of the D'Urbervilles, and Jude the Obscure, are representative of his spirit and style as a novelist.

The influence of one or other of these great analysts of man's soul is traceable in all that is most "modern" in recent literature, all that has endeavoured strenuously to fulfil the high task of literature and reveal man to himself. A. E. Housman's *Shropshire Lad*, the more realistic and dramatic part of H. G. Wells's work, the novels of Arnold Bennett, Joseph Conrad, the poetry of Masfield, Gibson, Lascelles, Abercrombie, and others.

But a more widely diffused influence was that of Stevenson and Kipling. Robert Louis Stevenson poured the keen, hectic joy of a short, consumptive life, full of travel, adventure, experiment, and achievement, into essays, *Virginibus Puerisque*, poems, English and

Scottish short stories, *New Arabian Nights*, *Dr. Jekyll and Mr. Hyde*, and novels, *Treasure Island*, *Kidnapped*, *The Master of Ballantrae*, *Weir of Hermiston*, all with a buoyant, courageous philosophy of their own and a studiously elaborated beauty of style.

His essays continued the tradition of Montaigne, Cowley, Addison, Lamb, and Hazlitt; to Hazlitt and to Sir Thomas Browne his style owes a debt of influence. His novels blend the historic, adventurous romance of Scott with a dramatic curiosity as to psychological and moral subtleties which is partly French in origin, and with a strain of the fantastic humour of Poe and De Quincey. He taught the English novelists a regard for form; and even the popular novel of later 19th century writers, the work of writers like Anthony Hope, Stanley Weyman, and others, is superior to its diffuse Victorian predecessor, not in character and humour, but in technique, style, and the working out of the story.

In Rudyard Kipling's work the spirit of modern journalism passed into fiction and poetry. Descriptive journalism—as distinct from the periodical essay—had attained to the rank of literature in the reports of the Crimean War written for the press by William Russell, and of the Franco-Prussian War by Russell and Archibald Forbes. Trained to journalism in India, at the same time a lover of the rich colours and varied rhythms of the school of Rossetti and Swinburne, Rudyard Kipling, after some experiments in verse and story concerned with Anglo-Indian life, came to his own in short tales of Indian life proper, of the soldier of the old regular army serving in India, and in verses, *Barrack Room Ballads*, on the latter theme.

#### Rudyard Kipling's Popularity

Clever journalism and imaginative interpretation are inextricably interwoven in his work, which touches its highest level in stories of Indian life like *Kim* and *The Conversion of Purun Dass*, animal stories as *The Jungle Book*, sketches of Sussex life and character, poems as *Recessional*, *Kabul Town*, *A Ballad of East and West*. For good and for ill no writer has enjoyed so wide a popularity since Dickens. The twang of his banjo is audible in much English and Colonial verse; his peculiar blend of realism and romance has been reproduced in the work of almost every writer who has touched on the life of Englishmen and others on the outskirts of civilization.

In the 'nineties of the 19th century the influence of contemporary

French literature was felt in the spirit and the form alike of English novel and poetry and critical prose. The doctrine of "art for art's sake" found ardent disciples in Oscar Wilde, whose early imitative poems were followed by prose essays of original and subtle beauty, *Intentions*, comedies in which something of the art of Congreve was revived, and one or two poems, *The Ballad of Reading Gaol*, which owed their tragic beauty to the bitter experience of which they were born; Arthur Symonds; Ernest Dowson, author of at least one immortal lyric; Lionel Johnson, the rare quality of whose scholarly and thoughtful verse time will make more manifest; Rachel Annand Taylor, whose lyrics have the jewelled richness and hardness of the Italian art of the Renaissance. The older tradition of the Humanities in English poetry, classical in spirit and form, was preserved in the verse of William Watson, and of Robert Bridges, the poet laureate.

#### The "Art for Art" Movement

But poetry has never been for Englishmen so purely an art, a question of exquisite form cultivated for its own sake, as for the French. For the English inspiration has ever been its source and *raison d'être*, and inspiration is born of a quickening theme, of life realized with a heightened intensity on this side or that—religion, country, nature, the vicissitudes of human experience. The "art for art" movement yielded place rapidly to poetry of two kinds—that whose inspiration comes from within, spiritual, symbolistic, religious, and that which seeks its subjects in the changing face of nature and men's lives, realistic, prophetic, combative. William Butler Yeats learned from Blake the significance of the imagination as the revealer of transcendental truths, and found in Irish mythology the symbols in which these truths may be shadowed forth. His lyrics hold a place of their own among the finest in the language.

Francis Thompson, morbid and devout, sensuous and metaphysical, found in all his themes, nature, child and woman, symbols of Catholic truth and Divine mysteries, the ultimate object of his ecstatic ardours expressed in a style full of rich tangled imagery reminiscent of Crashaw and Keats and Shelley, and in luxuriant, trailing rhythms. In *The Hound of Heaven* he has made one certain contribution to all future anthologies of English verse, a poem abounding in "images which find a mirror in every mind, and with

sentiments to which every bosom returns an echo."

But if Yeats and Thompson represent one direction in which poetry moved away from the cult of imagery and rhythm for their own sake, the stronger current was that which flowed towards actuality, the absorption into poetry of all the stuff of everyday experience, the employment, in preference to the jewelled, precious diction of romantic poetry from Keats to Thompson, of "language really used by men," including the slang and oaths of the low street. William E. Henley, as well as Kipling, led the way in *Hospital Verses* and *London Voluntaries*; he was followed by John Davidson, and the bulk of Georgian poets, John Masefield, William H. Davies, Wilfred Wilson Gibson, Ralph Hodgson, Rupert Brooke, Lascelles Abercrombie, though there are individual divergents, as Walter de la Mare, Sturge Moore, and the Irish poets A. E. (George Russell) and James Stephens.

This movement, too, has its metaphysical aspect, and it is here that one feels the influence of Meredith and Hardy. For these poets, also, have endeavoured to see the world round them through unprejudiced eyes, have broken with the tradition, religious, ethical, and artistic, of English poetry from Chaucer to Tennyson, have put forth on a North-West Passage of their own, with what result time only can tell. The effect of the Great War was, if anything, to intensify the movement, the desire for actuality, the groping after a metaphysic that corresponds to that actuality. Of all the abundant poetry which flowed home from the trenches but little dealt with the traditional topics of war, glory, and conquest.

#### The Great Sacrifice

It was charged with memories of England, of the beauty and sweetness of the homeland for which the writers were making the great sacrifice; a strenuous endeavour to see the terrible things around them as they really were, a seeking after some view of life that would without illusion reconcile these things in an harmonious whole. The haunting verses of Charles Sorley are typical poems of this generation, strangely unconcerned with the topics of young men's songs, wine and women and the luxury of passing sorrow, piercingly natural and direct in style, thoughtful and original, full of a high spirit of effort and resolve:

If I have suffered pain,  
It is because I would;

the poetry of one who has awak-

ened to a sense of the inner meaning and mystery of things before he has realized all their appeal to the senses and the imagination and the heart.

The English drama, which since Congreve has only at rare intervals, in the comedy of Goldsmith and Sheridan, been a channel of any importance to the stream of English literature, was given a fresh interest and significance by the witty social comedy of Oscar Wilde; and by the clever, vivid, paradoxical comedies of Bernard Shaw, who adapted Ibsen to the British taste for practical teaching and hearty humour; by Galsworthy's sensitive and sombre pictures of social injustice and cruelty; by others like Granville Barker, and by the very different Irish plays, poetic and symbolic, or, in the work of J. M. Synge, ironical and reflective, and the light and fanciful plays of J. M. Barrie.

#### Aspects of the Later Fiction

But no form of literature has diminished the popularity of the novel. The English writers who bulked most largely in the first two decades of the 20th century were the novelists: H. G. Wells, author of scientific romances and satirical social studies, reflecting as in a clear, many-sided crystal the tastes and tendencies of various strata of English society; Arnold Bennett, fantastic humorist and realistic portrayer of life in the "five towns"; John Galsworthy, whose novels are the counterpart of his plays; Joseph Conrad and Compton Mackenzie, realists with a fine sense for the beauty of setting and style. Gilbert Chesterton and Hilaire Belloc, poets, humorists, and essayists, are also authors of novels fantastic and satirical.

#### H. J. C. Grierson

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**Englishman, THE.** Leading daily newspaper in Calcutta. First appearing July 2, 1821, as *John Bull in the East*, in 1833 it was bought by H. Stocqueler, who changed its name to *John Bull*. A year later it became known as *The Englishman*. Under Major Fenwick's editorship it became a

recognized authority on military affairs. Macaulay is said to have written for it, and some of his *Essays* were printed and corrected in its office before being sent to The Edinburgh Review.

**English Review.** THE. English literary monthly, started in 1908. Austin Harrison was editor in 1910-23. The review has made a feature of poetry by Thomas Hardy, John Masefield, and others. In its pages in 1913 Frederic Harrison and Lord Roberts uttered striking warnings of the coming national peril. Other contributors have included Arnold Bennett, Joseph Conrad, John Galsworthy, R. B. Cunninghame Graham, Maurice Hewlett, Ford Madox Hueffer, Eden Phillpotts, G. Bernard Shaw, and Sidney Webb.

**English River.** Estuary on the W. side of Delagoa Bay, in Portuguese E. Africa. It is formed by the union of the rivers Umbelosi and Tembi.

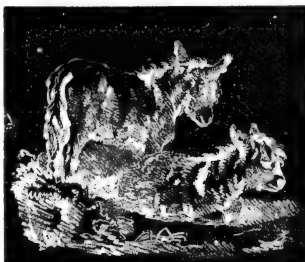
**Englishry.** Term used in early English law. Presentment of Englishry was the offering of proof, in cases of violent death, that the person killed was an Englishman, not a Norman, as, if a Norman was killed, the community had to pay a fine. This collective punishment was abolished in the time of Edward III. The term was also used by Macaulay and others for the English settlers in Ireland.

**Engrailed.** In heraldry, a line of division, or an outline of a charge, of irregular form, showing a series of semi-circles, with points outwards. The word, from Fr. *grêle*, hail, literally means cut into points like hailstones.



**Engrailed in heraldry** **Engraver** **Beetle** OR BARK BEETLE (*Scolytidae*). Genus of small cylindrical beetles, of which there are numerous species. Most of them burrow under the bark of trees, where the female lays her eggs in a straight tunnel, from which the grubs burrow out at right angles. Most of the species are extremely destructive, causing much damage to the forests of the U.S.A. and Europe. See Beetle.

**Engraving.** (1) Art of drawing on metal or wood by means of an incised line; and (2) impression in ink obtained from such drawing on paper or similar substance. In wood engraving the lines to be printed appear in relief, the wood between them being cut away. In the metal process, known as *intaglio*, the lines are sunk or incised



Engraving. Example of stippled engraving on copper of a sketch by G. Morland. Left, the copper plate on which the design was engraved. Right, the impression



by means of a graver or burin. The latter implement is a steel rod, four or five inches long, of square or lozenge section, with a cutting point and edges obtained by sharpening the head in an oblique section. There are various forms of wooden handle, the commonest one resembling an elongated half pear.

Plates of several different metals have been used for intaglio engraving: copper, steel, zinc, iron, silver, and even brass and pewter. Copper and steel, however, and especially copper coated with a thin layer of galvanised steel, are by far the most common. Pure copper is softer and easier to work than pure steel, but for the same reason does not wear so well under the press as the harder metal, and so does not throw off as many good impressions. The use of steel plates, though less ductile, was developed during the 19th century on account of their greater powers of resistance, until the copper plate covered with galvanised steel was substituted for them.

Wood engraving is really wood cutting, and so does not come within the scope of engraving proper. Lithography, which is a form of engraving on stone, is dealt with

under that title. The lines of an engraving on metal are often modified by the use of the etching needle, but etching, although a branch of engraving, differs from it in so many respects that it constitutes a separate art. The line of the graver, for example, is obtained by direct pressure upon the metal, whereas the etching needle is used in much the same way as a pencil, the subsequent incision being obtained by the "biting" of the acid on the plate.

There is evidence of the existence of wood-cut playing cards as early as 1440, but the earliest extant intaglio engraving, a "Flagellation" belonging to a Passion series in the Berlin Museum and attributed to a master in Upper Germany, is dated 1446. This disposes of Vasari's story that the invention of the art was due to Maso Finiguerra, the Florentine goldsmith and niellist, in 1460: there is reason to believe that even in Italy the art was being practised at least as early as 1450. Maso, however, may serve as a starting point for the history of that school of Italian engravers that arose directly out of the niello workers of the 15th century. At



Engraving. Wood block of a drawing by Harrison Weir, after Sir E. Landseer. Left, the wood block on which the outlines showing white are raised to catch the ink and make the black lines in the finished result shown at the right



first the taking of impressions from the gold and silver plates engraved according to the niello method by the goldsmith or silversmith was, doubtless, for the sake merely of checking his work; later, as the artistic value of the impression itself became evident, the scope of engraving was extended.

Among famous Italian painters of the 15th century who practised engraving were Antonio Pollaiuolo and Andrea Mantegna (*q.v.*); while Marco Antonio Raimondi, the engraver of Raphael's pictures, may be claimed as the first of the "reproductive" engravers. In Germany an illustrious school of engravers flourished in the late 15th century, including in its ranks Martin Schongauer, Albrecht Dürer, Albrecht Altdorfer, the Behams, and Heinrich Aldegrever. Line engraving was somewhat later in beginning in France, but Jean Duvet (1485-1561) and Jean Cousin (1501-89) were famous 16th century engravers, and the French portrait engravers of the 17th century touched heights that have hardly been equalled since. In Great Britain the great artists of the 18th and early 19th centuries owe much to British "reproductive" engravers, and William Blake's original work in this medium was unique.

**Engrossing** (Fr. *en gros*, in large). Term used by English lawyers for the copying out, in a "fair hand," of any legal document. A lawyer always makes out a draft of any important document, and has it engrossed, and the engrossment is executed by the parties concerned.

**Engrossing.** Word used in former days in England for what amounts to buying and selling wholesale. In other words the engrosser was a middleman. This was early regarded as an offence against law and custom, for it tended to put up the price, and various statutes declared it illegal, the chief being one of 1552. These were directed mainly against the buying and selling of corn and other foodstuffs wholesale, and the operation of the laws tended to keep these in and around the places where they were grown. As society became more specialised this was very irksome, and even when the laws were in full force licences were issued allowing certain persons to buy and sell wholesale. In 1663 an Act permitted engrossing as long as the price of corn did not exceed 48s. a quarter; and in 1773 the earlier statutes against it were repealed, but as an offence against the common law engrossing disappeared finally with further Acts in 1844.

**Enham** OR KNIGHTS ENHAM. Parish of Hampshire, 2 m. N. of Andover. In 1919 a scheme was started for taking over the Enham estate of 1,027 acres to erect buildings for the treatment and training of disabled soldiers. The treatment covers electric, whirlpool, and paraffin baths for men with stiff limbs, and psychotherapeutic methods for neuroathenic and shell-shock cases. The training embraces agriculture, horticulture, the care of stock, poultry farming, carpentry, furniture and boot-making, tailoring, building, and painting. The British Red Cross Society made a grant of £10,000 for the purpose of building and equipping a medical block, the first of its kind to be established in England. Pop. 169.

#### Enhanced

(Anglo-Fr. *enhancer*, to raise). In heraldry, any ordinary borne higher up than its usual position is said to be enhanced. **Enhanced in heraldry** See Ordinary.



Enhanced in heraldry

**Enharmonic** (Gr. *enarmonikos*, fitting in). In music, the interval between, for example, E natural and F flat, or C sharp and D flat. Through the influence of the keyboard instruments, with their fixed twelve notes to the octave, the term often loses this meaning and is defined as "a change of name without a change of pitch."

Key F# Schubert, Op. 94, No. 12



Enharmonic. Example of enharmonic change in music

**Enid.** Feminine Christian name. Of Celtic origin, it means spotless purity. Enid is a character in the Arthurian legend, being the pure and faithful wife of Geraint.

**Enid.** City of Oklahoma, U.S.A., the co. seat of Garfield co. It is 54 m. N.W. of Guthrie, and is served by the Atchison, Topeka, and Santa Fé and other rlys. The seat of Phillips University, it contains a college of fine arts and a free public library. It has foundries, machine shops, flour mills, lumber mills, and boiler works, and trades extensively in poultry and the agricultural produce of the locality. It dates from 1893, when it was granted its city charter. Pop. 21,355.

**Enlarging.** Photographic process of making prints of larger size

from negatives. The usual process is to project an image of an illuminated negative by means of a lens upon a sheet of bromide paper (*q.v.*). When the negative is illuminated by artificial light it is usually necessary to place a condenser behind the negative to equalise the illumination. The condenser consists of two plano-convex lenses of diameter a little greater than the diagonal of the negative. The negative image is thus projected and focussed upon an easel as in the use of an optical lantern. The operation with such apparatus is carried out in a dark room, but enlarging boxes and cameras are made for use in full daylight, the bromide paper being then carried in a loose dark slide. See Camera; Photography.

**Enlistment.** Act of the individual in voluntarily contracting to render military service as a private soldier to the state. The form of contract is the attestation paper, which the recruit, after being accepted and passed medically fit, is required to sign when taking the oath of allegiance, in the presence of an officer, magistrate, or other public dignitary, who witnesses or attests the signature. The period of service in the British army is laid down in the Army Act and recruiting regulations, and is normally 12 years, of which from three to eight is spent with the colours and the remainder in the reserve. Recruits may choose the branch of the service they prefer, and skilled men usually select one of the specialist corps which offer better pay. In the line the recruit may choose any regiment for which he has a preference and which is open to recruiting. He cannot then be transferred to another regiment without his consent. A special branch of the army is detailed for recruiting duties, with an officer in charge of each district. Enlistment is only applicable to voluntary recruiting. It enables a professional army of high qualifications to be obtained even in competition with other employers of labour.

The disadvantage is obvious when, as in the case of the Great War, a greatly increased army is essential, and it is necessary, even after the introduction of compulsory service, to pay the soldiers at the normal high rate as compared with other countries, who, by a normal system of conscription, obtain practically gratuitous military service from the male population. Aliens and negroes may be enlisted in the British army, but cannot be promoted beyond the rank of warrant officer. See Army, British; Compulsory service.

**Ennel.** Lough or lake in the S. of co. Westmeath, Ireland. It is about 5 m. long and 2 m. broad, is drained by the Brosna river, and has several wooded islets.

**Ennerdale.** Lake in the W. of Cumberland, England. From it Whitehaven draws its water supply; it is 3 m. long and  $\frac{1}{2}$  m. broad.

**Ennis.** Urban dist. and county town of co. Clare, Ireland. It stands on the Fergus river, 25 m. N.W. of Limerick, on the G.S. & W. and West Clare Rlys. Here are the Roman Catholic pro-cathedral and college of the diocese of Killaloe, and the ruins of a Franciscan abbey. It has a statute of O'Connell and in the neighbourhood are the ruins of Clare Abbey. There are large flour mills and breweries, and timber and grain are exported through Clare Castle, its port. Market day, Sat. Pop. 5,472.

**Enniscorthy.** Market town and urb. dist. of Wexford, Ireland. It stands on the Slaney, 77 m. S. of Dublin by the Dublin and S.E. Rly. The chief building is the castle, built by the Norman conquerors in the 12th century. The town is an important agricultural centre, having fairs and markets, while there is some shipping on the river. There are other industries, including brewing, distilling, and tanning. Near by is Vinegar Hill (*q.v.*). Made a municipality about 1610, Enniscorthy was represented in the Irish Parliament until 1800. Market days, Sat. and Thurs. Pop. 5,500.

**Enniskillen** OR INNISKILLING. Market town and co. town of Fermanagh, Ireland. It stands on an island in the river between the upper and lower loughs Erne, and has suburbs on either side, with which it is connected by bridges. It is a station on the G.N. of Ireland Rly., 116 m. N.W. of Dublin. There are some small manufactures and a fair trade in agricultural produce, while steamers go along the river. Enniskillen became a municipality about 1600, and was represented in the Irish Parliament. From 1800 to 1885 it sent a member to the parliament of the United Kingdom. It is chiefly

famous, however, as a Protestant stronghold in the time of William III, and as giving its name to two regiments of the British army, fusiliers and dragoons. Market days, Tues. and Thurs. Pop. 4,850.

**Enniskillen, EARL OF.** Irish title borne since 1789 by the family of Cole. In 1760 John Cole, an Irish M.P., was made a baron, and his son William, the 2nd baron, was made a viscount and an earl, both in the peerage of Ireland. The 2nd earl was made a British peer as Baron Grinstead in 1815, and from him the present earl is descended. William Willoughby Cole, the 3rd earl (1807-86), made a fine collection of fossil fishes, now in the British Museum. Florence Court, Enniskillen, is the earl's chief seat, and his eldest son is known as Viscount Cole.

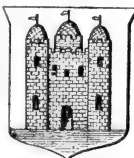
**Ennius, QUINTUS** (239-169 B.C.). Earliest of the great Roman poets. Born at Rudiae, in Calabria, he was not a full Roman citizen, acquiring that privilege at a later date. While serving in the Roman army in Sardinia, he attracted the notice of the elder Cato, who took him to Rome, where his knowledge of Greek and literary acquirements procured him admission to the Seipionic circle. His works embraced a wide variety of subjects, but it was as the author of some twenty tragedies and of the *Annales*, an epic of Roman history—in which, for the first time, the Latin language was moulded to the Greek hexameter—that he achieved immortality. Only fragments of his works survive, chiefly in the form of quotations in later writers, especially Cicero. His reputation as a poet stood very high, some ancient critics regarding him as the equal even of Virgil. His versification, though possessing a certain rugged dignity, is harsh compared with the finish which Latin poetry attained in the hands of Horace and Virgil.

**Enns.** Town and river of Austria. The town, which is 11 m. from Linz, stands just where the river falls into the Danube. An old place, it grew up around a castle built about 900. It became a free city, and was at one time a prosperous commercial place. Its chief buildings are the town hall, the castle, built in the 18th century, and a Gothic church. It was at one time fortified, and it is said that the money for the fortifications came from the ransom of Richard I. Near it is the monastery of S. Florian (*q.v.*). The river rises in the mountains near Radstatt and flows through Styria, passing through lovely mountainous scenery. Its course is east and then north. Its chief tributaries are the Salza and Steyer; its length is about 150 m.

**Enoch.** Name of four men in the O.T. They are a son of Cain, a grandson of Abraham, a son of Reuben, and a son of Jared. The last, the father of Methuselah, is recorded to have lived 365 years, and to have been translated without dying. He is described as being the seventh from Adam, and the Epistle of Jude (verse 14) quotes a prophecy ascribed to him. See Enoch, The Book of.

**Enoch, THE BOOK OF.** One of the non-canonical O.T. Apocrypha or Pseudepigrapha (*i.e.* works written under an assumed name), written originally partly in Aramaic and partly in Hebrew. It incorporates fragments of the Book of Noah. The work is not a unity in any sense, and ranges from about 200 B.C. to A.D. 64. It has therefore been described as a library rather than a single book. In the words of Dr. Charles (Religious Development Between the Old and the New Testaments), "it touches upon every subject that could have arisen in the ancient schools of the prophets." These subjects include the origin of evil, the millennium, the Messiah, the future life, and even the Hebrew calendar. The book seems to have had a considerable influence on N.T. theology. See Apocrypha.

**Enoch, BOOK OF THE SECRETS OF.** A book belonging to the same category as the Book of Enoch. Dr. Charles describes this book as 2 Enoch and the Book of Enoch as 1 Enoch. The work, preserved only in Slavonic, seems to have been written by a Hellenistic Jew in Egypt at about the beginning of the Christian era. It is related in some way to a Hebrew book referred to in Jewish literature (in the Zohar) as "the book of Enoch" and the "Book of the Secrets of Enoch." The author is orthodox, but at the same time so broad-



Enniskillen arms



Enniskillen, Fermanagh, Ireland. View of the town and quays on the river connecting the upper and lower loughs Erne

minded as to adopt into his philosophical system Platonic, Egyptian, and Zend elements. The book describes Enoch's ascension and voyage through the seven heavens.

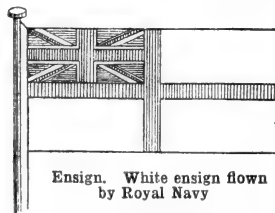
**Enos.** Town of Thrace, the ancient Aenos. It lies at the mouth of the Maritza, on the Aegean Sea, about 40 m. N.W. of Gallipoli, and carries on some trade. In April, 1915, an Allied landing took place in Enos Bay. Pop. 7,000.

**Enschede.** Town of Holland, in the prov. of Overijssel. It is 29 m. N.E. of Zutphen, and is a seat of the cotton-spinning and weaving industries. Enschede is a rlv. junction and has communication with the coal districts of Westphalia. It was severely damaged by a conflagration in 1862. Pop. 41,602.

**Ensemble** (Fr. together). Concerted vocal or instrumental piece. In opera it is a performance by all the principals who are on the stage.

**Ensimform Cartilage** (Lat. *ensis*, sword; *forma*, form). Thin process of cartilage forming the lower end of the sternum or breastbone, and projecting downwards between the cartilages of the seventh ribs. See Cartilage.

**Ensign.** Flag which a ship carries astern to indicate her nationality. Each country has separate



Ensign. White ensign flown by Royal Navy

ensigns for its navy and its mercantile marine. Great Britain has three: the white ensign, flown only by ships of the Royal Navy and vessels of the Royal Yacht Squadron; the blue ensign, which is the flag of the Royal Naval Reserve; and the red ensign, the flag of the merchant service. War Department craft fly a blue ensign with crossed swords on it. The earliest date on which the S. George's Cross was flown by English admirals was in the Cadiz Expedition of 1596. When a ship flies her ensign upside down it denotes that she is in distress. See Flag.

**Ensign.** Rank in the British army, now obsolete. The rank was that given to an officer of the infantry on first being commissioned, and it was his duty to carry and guard the regimental colours, both on parade and in the field. The corresponding rank in the cavalry was cornet, and both were discarded in 1871 when the purchase

of commissions was abolished, the rank of second-lieutenant being substituted.

**Ensilage** (Span. *en*, in; *silo*, underground granary; Lat. *sirus*). Method of keeping grass, clover, maize, and any green fodder crops in a succulent condition throughout the winter. It can be usefully adopted in a year of drought, when root-crops fail, or in a very wet season as an alternative to hay-making. The herbage to be converted into "silage," as the finished product is termed, is placed in a specially constructed receptacle (silo), or simply heaped up in a stack or clamp and covered with earth. When a silo is employed the material is usually chaffed up, to allow of better packing. The resulting silage differs in texture and chemical composition from the raw material, and also from hay, owing to changes brought about by processes of fermentation, due to bacteria, and to ferments (enzymes) in the herbage. It is necessary that air be excluded, and this is effected by the application of pressure and by enclosing the raw material in an airtight space.

A distinction is drawn between sweet and sour silage, that made in a stack being as a rule sweet, and that made in silos and clamps, sour. Sour silage is made at a temperature below 120° F., and owes its acidity to the action of various acid-forming bacteria. Its unpleasant odour is readily absorbed by milk, and consequently it should not be used for milch cows. To make sweet silage, which is sweetish to the taste and possesses an aromatic smell, a temperature of 130° F. to 160° F. is necessary, as the formation of acid is thereby prevented. The desired temperature cannot be secured if air is at first excluded, and therefore the herbage must be filled slowly into the receptacle and pressure applied by degrees.

Properly made silage is a valuable feeding-stuff in both its forms, but is not of precisely the same nutritive value as the herbage from which it is made. The chief results of the chemical changes that take place during fermentation are loss of sugar, alteration of part of the albuminoids into nitrogenous substances (amides) of less food value, and conversion of part of the fibre (cellulose) into a digestible form.

The system of ensilage was introduced into Great Britain from France about 1880-85, but the results were less satisfactory than in France and the U.S.A., and it has not been generally adopted. See Agriculture; Crops; Pasture.

**Enstatite.** Common rock-forming mineral. One of the pyroxene

group, it crystallises in the rhombic system, in stout prismatic crystals. Chemically a metasilicate of magnesium, it occurs in serpentines and peridotites, in the Whinsill dolomite, the Cheviot andesite, and generally as a primary constituent of intermediate and basic igneous rocks. The word enstatite, from Gr. *en-states*, adversary, refers to the refractory nature of the mineral. See Crystallography.

**Entablature.** Term in architecture signifying the combination of architrave, frieze, and cornice at the summit of a building. In early Greek architecture the entablature, like the supporting column, was frequently of wood; and there is evidence to show that it was constructed of this material for some time after wooden columns had been replaced by stone or marble. In the Greek towns of S. Italy wooden entablatures upon stone columns are known to have been in use for several centuries. The entablature is necessarily a prominent feature of the classic or horizontal styles of architecture, rather than of the Gothic or vertical styles; but its principle is universal. The original meaning of the word was a board work or flooring (Lat. *tabula*, plank). See Architecture; Building; also illus. p. 2275.

**Entail.** Legally, the settling of an estate on a man and his heirs. In feudal times land was granted to a man and his heirs in tail male or tail general, the idea being that if an heir failed it would revert to the king or lord who granted it. In time, however, the practice grew up of regarding it as a free estate as soon as an heir was born, thus depriving the grantor of his rights. The statute De Donis Conditionalibus of Edward I put an end to this practice, but only for a time, as legal fictions for evading it were invented. The entailed estates of today are simply settled estates, but they can only be settled on living persons and a period of 21 years beyond. The entail can be broken with the consent of the heir and after the performance of certain legal formalities. The word comes from the French *tailleur*, to cut, the idea being that from an entailed estate, something, i.e. freedom of bequest, had been cut. See Land Laws; Real Property; Settlement.

**Entebbe.** Administrative capital of the Uganda Protectorate, E. Africa. It is situated on a promontory to the W. of Murchison Bay in Lake Victoria, and is connected with Kisumu and other lake harbours by steamer. Mengo, the capital of Buganda, is 25 m. to the N.E. Pop. dist. (European) about 150.

**Entente Cordiale** (Fr., cordial understanding). Phrase that became current early in the 20th century to signify the friendly relations then beginning to exist between Britain and France. The entente began soon after the South African War and was greatly helped by the influence of Edward VII and the steady realization of the German menace. It culminated in the alliance of 1914.

**Enteric Fever** (Gr. *enterikos*, intestinal). Infective disease caused by the bacillus typhosus. It is most frequently conveyed by drinking water. *See* Typhoid Fever.

**Entering Edge**. Front edge of an aeroplane wing. It is this which first encounters or enters the mass of air through which the machine is to progress. *See* Aeroplane.

**Enteritis** (Gr. *enteron*, intestine). Inflammation of the mucous membrane of the intestine. The condition may be due to eating unsuitable or unsond food, such as unripe fruit or decomposing meat, or to irritant poisoning by arsenic, mercury, and other substances. Secondary enteritis is a symptom of many diseases, particularly cholera, dysentery, and typhoid fever.

The prominent symptoms are abdominal pain, severe diarrhoea, and sometimes blood in the evacuations. In severe cases ulceration of the intestine may be followed by perforation and fatal peritonitis. Epidemic enteritis, or "summer diarrhoea," is a very fatal disease among infants under one year of age, in large towns sometimes accounting for one-fifth of the total infant mortality. The causation is not fully known, but the disease is most prevalent in hot, dry weather, the dust blown up from dirty streets and refuse heaps being an important factor.

**Enteroptosis** (Gr. *enteron*, intestine; *pōsis*, falling). General dropping or downward displacement of the abdominal organs, chiefly the stomach and intestines. It usually develops gradually. The condition is more frequent in women than in men, and is often associated with neurasthenia. Massage, electricity, and physical exercises may be employed to improve the tone of the abdominal vessels, and the symptoms are often relieved by wearing a belt so as to support the sagging organs.

**Enterprise**. British steamship, the first to make the passage between Great Britain and India. She left London Aug. 16, and reached Calcutta Dec. 7, 1825. The Enterprise, which displaced 480 tons and had engines of 120 h.p., was also the first steamship to double the Cape. A light cruiser of

this name, the first of a new type, was launched in 1919. She had 89,000 engine-power, giving a speed of 33 knots, was 535 ft. in length, and carried seven 6-in. and other guns.

**Entertainments Duty**. Tax levied in the United Kingdom on persons attending theatres, music halls, and other places of amusement; also football and cricket matches, and other open-air sports. Introduced in the Budget of 1916, it was charged on all tickets of admission as follows:

Below 2½d.	..	..	1d.
Between 2½d. and 4½d.	..	..	1½d.
" 4½d. .. 7d.	..	..	2d.
" 7d. .. 1/-	..	..	3d.
" 1/- .. 2/-	..	..	4d.
" 2/- .. 3/-	..	..	6d.
" 3/- .. 5/-	..	..	9d.
" 5/- .. 7/6	..	..	1/-
" 7/6 .. 10/6	..	..	1/6
" 10/6 .. 15/-	..	..	2/-

Beyond this it was 2/- on the first 15/- and 6d. for every 5/- or part of 5/- in excess of that amount. It was paid to the inland revenue authorities by the proprietors, who charged it on the tickets of admission. Entertainments promoted by schools and for charitable purposes were exempt. By the budget of 1924, when the payment, excluding the amount of the duty, does not exceed 5d no duty is levied. Also other reductions were made.

**Euthymeme** (Gr. *en*, in; *thymos*, mind). Term in logic. According to Aristotle, it is merely a rhetorical syllogism, founded on probability, and therefore not demonstrative. A later meaning is a syllogism in which one premise has to be "mentally" supplied: *e.g.* All men are mortal; therefore Socrates is mortal; where the minor premise, Socrates is a man, is omitted. *See* Logic.

**Entombment**. Literally a burial. In a special sense, however, it is applied to the burial of Jesus Christ, and as such is the subject of several notable paintings. The most famous of these are one by Raphael, in the Borghese Palace at Rome, one by Titian in the Louvre, and one by Caravaggio, in the Vatican.

**Entomology** (Gr. *entomon*, insect; *logos*, science). Branch of zoology which deals with insects. The offices of the Entomological Society of London are at 11, Chandos Street, Cavendish Square, W. *See* Insects.

**Entomotraca** (Gr. *entomon*, insect; *ostrakon*, shell). One of the great divisions into which crustacea are divided. It includes the lower forms of crustaceans, characterised by a variable number of body segments, the absence of the gastric mill (grinding apparatus), and life usually beginning in the nauplius stage. *See* Crustacea.

**Entophytes** (Gr. *entos*, within; *phyton*, a plant). Name given to plants which live on other plants. *See* Fungus; Parasite.

**Entozoa** (Gr. *entos* within; *zōon*, animal). Name given to parasitical worms which live in the interior of the body of their host, as the tape worm and flukes. They are opposed, therefore, to the ectozoa, which live on the exterior. *See* Parasite.

**Entr'acte** (Fr. *entre*, between; *acte*, act). Short piece of music played by the orchestra between the acts or scenes of a play. It is generally of a suave and melodious character. Sometimes, in a musical play, it consists of the development of a melody or *leitmotiv* embodied in the work; sometimes of an independent piece.

**Entrécasteaux**, JOSEPH ANTOINE BRUNT D' (1739-93). French sailor. A native of Provence, he entered the navy. He commanded a ship in the war against Britain, but his great work was as a discoverer. As commander of the French fleet in the E. Indies, he visited China; he was also governor of Mauritius and the Ile de Bourbon. He sailed into the south seas and made several discoveries therein, a strait, a point, and a group of islands commemorating his name. He was in the East when he died, July 20, 1793.

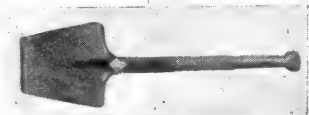
**Entrée** (Fr.). Term in cookery. It is usually applied to a "made" dish served between courses, *e.g.* before the roast or principal dish of a dinner. In France, on the other hand, entrées may consist of fish or roast or braised meat, and are not merely fancy dishes.

**Entremets** (Fr. *entre*, between; *mets*, dish). Term in cookery. It is used for a side dish, such as a sweet or savoury, served after the roast at dinner.

**Entre Minho e Douro**. Prov. of N.W. Portugal. It lies between the Minho and Douro rivers, facing the Atlantic. Mountainous and well watered, it has a mild climate, and produces maize, wine, oil, fruit, and nuts, while palms and fuchsias thrive. Cattle and pigs are reared, timber is cut on the mts., and fish abound in the rivers. Though implements are primitive, agriculture flourishes. The roads are bad; ox-traction is the chief means of transport. Oporto is the chief port. The prov. is divided into the three districts of Vianna do Castelo, Braga, and Porto Area, 2,790 sq. m. Pop. 1,289,859.

**Entrenching Tool**. Implement carried by each soldier in the firing line and used to excavate temporary cover for protection against the enemy's fire until complete

trenches can be dug. In open warfare, when the advance is held up by hostile fire, the troops lie down and dig a narrow, shallow pit in which to lie, throwing the earth to the front to form a parapet. If re-



Entrenching tool used in German army. Above, type issued to British troops

quired, the pit may be deepened to provide cover in a kneeling and then standing position, and if it is finally necessary to hold the position the pits may be linked up to form a trench. The British entrenching tool is double-ended, and provides both a pick and small spade, the handle being easily detachable and carried apart from the head. The German tool is merely a small spade to which the handle is a fixture.

**Entrenchment.** Military term meaning the employment of excavated positions for the protection of troops in attack or defence. This method of warfare appears to have been introduced by the Turks, but was not adopted by the soldiers of Christendom until about the 16th century. During the Great War most elaborate trench systems were used, including shelters many feet below the surface which were unaffected during bombardments except by a direct hit from large calibre explosive shell. Concealment of trenches from enemy observation is most important, but aerial reconnaissance has rendered this extremely difficult. For a parapet which will resist modern rifle fire at medium range the following depths of various materials are required: shingle, 6 ins.; brickwork, 12 ins.; sand in bags or boxes, 18 ins.; loose sand, 30 ins.; earth, 40 ins. See Tactics; Trench Warfare.

**Entrepôt** (Lat. *interpositus*, placed between). French word meaning a bonded warehouse, i.e. a store where imported goods are stored pending the payment of duty thereon. In English usage, however, it has come to mean a seaport or an inland town through which much produce merely passes; e.g. Singapore, a great port on a small island, is one of the most important of the world's entrepôts.

**Entrepreneur** (Fr. *entre*, between; *prendre*, to take). Word used for one who brings capital and

labour together. Employing them as he thinks best, he pays interest to the one and wages to the other, keeping any balance of profit for himself. The old theory of economics that the partners in industry were the landowner, the capitalist, and the labourer left out of account the fact that in large undertakings the directing brain often belonged to none of these classes. He was simply one who hired the others, and the word *entrepreneur* was invented to describe him. The term has never taken any deep hold in England, however, although sometimes used by economists for convenience. See Labour: Political Economy; Prices.

**Entre Rios** (Span., between rivers). Prov. of N.E. Argentina, occupying the angle between the Paraná and Uruguay rivers. The surface is low, alternating between swamps and prairies, while in the N. it is heavily forested and furnishes wood for building and cabinet-making. Cattle, sheep, and horses are raised by the million, and, together with hides, horns, and other animal products, are exported. Cereals, wine, and alfalfa are grown. It has a healthy climate, and, traversed by several rlys. and waterways, it is one of the most prosperous provs. in the republic. The capital is Paraná. Area. 29,241 sq. m. Pop. 425,373.

**Entre Rios.** Town of Brazil, in the state of Rio de Janeiro. It is about 50 m. by rly N. of Rio de Janeiro, in a coffee-producing district. Pop. 8,000. There is another Brazilian town of this name in the state of Goyaz, 45 m. N.W. of San José.

**Entresol** (Fr. *entre*, between, *sol*, ground). Term used in French architecture for an intermediate storey in a building. Its use is generally confined to a low storey placed between the ground floor and the first floor proper. In this sense it is really a sub-division of a lofty ground storey.

**Entropy** (Gr. *entropē*, turning in). An important concept in the theory of heat engines and the science of thermodynamics. The entropy of a substance is a quantity which increases with any increase in the total heat of the substance and likewise decreases with any decrease in the total heat. The change of entropy is measured by the change in the quantity of heat divided by the absolute temperature at which this change takes place. Thus the entropy of a system under what are known as adiabatic conditions, where heat neither enters nor leaves the system, is constant.

Where heat simply flows from a hot body to a cold one, the loss of

entropy by the hot body is more than made up by the gain of entropy by the cold body, so that there is a net gain of entropy on the whole. In a heat engine, heat flows from a hot body to a cold one, but in the process some of the heat disappears, being converted into work. In the case of a theoretical engine of maximum efficiency, there is no change of entropy due to this process, but no actual engine succeeds in converting as much of the heat into work as the theoretically perfect engine, and the effect of an actual heat engine is a net gain of entropy.

As heat is everywhere flowing from hot bodies to cold ones, the entropy of the universe as a whole is continually increasing, and is often said to be tending towards a maximum. In such an imaginary condition of maximum entropy, there would be no motion, all the existent energy of the universe would be converted into heat, and the whole would stagnate at a uniform temperature. See Carnot's Cycle; Energy; Thermodynamics.

**Enuresis** (Gr. *en*, in; *ourein*, to urinate). Involuntary discharge of the urine. It is most frequently seen in young children who have not acquired normal control over the bladder. It is sometimes due to irritation of the bladder by urine containing uric acid crystals, or may result from irritation set up by a polypus or worms in the rectum. Care should be taken not to frighten a nervous child by threats of punishment.

**Envelope.** Cover for a letter. The making of envelopes, one in which female labour is mainly employed, is connected with the stationery trade. The processes, usually carried out by machinery, are those of cutting, gumming, and folding the paper. See Paper, Stationery.

**Envelope.** In geometry, a curve generated by the successive positions of a line. The envelope is a curve to which the line, or family of lines as it is more usually expressed, is always a tangent. A caustic curve (*q.v.*) in optics is a familiar example of an envelope.

**Envelope.** Gas bag of an airship, or, in a rigid airship, the whole body of the vessel within which the gas bags are housed. Gas bags are made of skin or fabric, and the outer envelope of the rigid airship is of a stouter fabric, rubberised or otherwise treated so as to resist the absorption of moisture and the effects of weather. See Airship.

**Enver Pasha** (1882-1922). Turkish soldier and politician. Born at Constantinople of humble parentage, he entered the Turkish army in 1896. He first came into notice

in connexion with the Young Turk movement in 1905 at Salonica, and three years later joined the revolutionaries,



Enver Pasha,  
Turkish soldier

who in July, 1908, captured *Monastir*, where a constitution, accepted by the sultan *Abdul Hamid*, was proclaimed. Enver soon afterwards was appointed military attaché at Berlin, but on the outbreak of the Turkish counter-revolution in March, 1909, he returned to Salonica, and assisted in the deposition of *Abdul Hamid*.

Enver then went back to Berlin, and in 1910 paid a visit to London. In 1911 he organized the Arabs of Tripoli against the Italians in the Tripoli War. In the second Balkan War he recaptured *Adrianople* from the Bulgarians in July, 1913. Shortly before he had become minister of war with the rank of a pasha, and married one of the imperial princesses. One of the leading spirits of the Committee of Union and Progress, the central organization of the Young Turks, he was personally pro-German, his influence being one of the factors that brought Turkey into the Great War against the Entente. After the submission of Turkey in 1918 Enver fled to the Caucasus. He encouraged the Turks in their resistance to the terms of the Peace Treaty in 1920. He was killed in *Bokhara*, Aug. 4, 1922.

**Environment** (Fr. *environ*, around). Biological term for the sum total of all the conditions, agencies, and influences which affect the development, growth, life and death of an organism, species, or race. Various theories of evolution have maintained; on the one hand, that variations in animals and plants arise so that they may be adapted to environment; on the other hand, that environment itself produces modification in the living organism. In the absence of adaptation to environment, no organism could live or reproduce itself, and the main object of a living creature must be to become more and more perfectly adapted to its surroundings. The term is usually understood to refer to physical, chemical, or material agencies. With reference to man it includes, in its widest sense, mental and spiritual agencies, so that it may be said that each individual lives in a physical, mental, and spiritual environment. See *Evolution*.

**Envoy** (Fr. *envoyer*, to send). Term used for one sent on a diplomatic errand. It is more general than ambassador, being used for persons who go on temporary missions to foreign courts as well as for more permanent officials. The former are merely described as envoys; the latter are envoys extraordinary, and include ambassadors. See *Diplomacy*.

**Enzeli**. Town of Persia, in the prov. of Gilan. It stands on the S. shore of the Caspian Sea, 16 m. N.W. of Resht. A shipping centre, it came into prominence in Aug., 1918, in connexion with a British move on *Baku* (q.v.). In May, 1920, a small British force stationed here was withdrawn on the arrival of a Bolshevik force from *Baku*.

**Enzyme** (Gr. *en*, in; *zymē*, leaven). Substance formed by micro-organisms and living animal and vegetable cells, which transforms organic compounds into simpler bodies. The most familiar example of enzyme action is the fermentation of sugar by means of yeast, a minute unicellular organism. The yeast cells contain an enzyme called *zymase*, which converts sugar into alcohol and carbonic acid gas. The enzyme itself is unchanged in the process, and a very small quantity is therefore capable of causing a large amount of transformation. The process probably resembles the familiar catalytic action of inorganic chemistry. Enzymes play a large part in the digestion of food. *Ptyalin*, which is secreted by the salivary cells, converts cooked starch into dextrin and maltose; *pepsin*, secreted by cells in the stomach, changes protein to proteoses and peptones; and enzymes in the pancreatic juice convert fat into simpler bodies. The souring of milk and the decomposition of meat by bacteria are other instances of enzymic changes.

**Eoanthropus** (Gr. *eōs*, dawn; *anthropos*, man). Systematic name of the oldest known European race with distinct head traits. It was given by A. S. Woodward to some fossil bones now in the British Museum, unearthed in 1912 at *Piltown*, Sussex. After their discoverer, *Charles Dawson*, the species is called *E. Dawsoni*. Other remains were subsequently found. See *Man*; *Piltown Skull*.

**Eocene** (Gr. *eōs*, dawn; *kainos*, recent). Name given to the earliest part of the Tertiary period, when stratified rocks, the eocene system, were being formed. It followed the Cretaceous period, the strata of both ages merging gradually in S. Europe, America, and New Zealand. In W. Europe, at the end of the

Cretaceous period, great geographical changes were in progress; consequently there is a sharp line of demarcation between the two sets of strata. Eocene beds usually rest on eroded surface of chalk. Eocene rocks of W. Europe are usually soft sands and clays, with some limestone and marl; all were laid down in local basins under marine, brackish, or fresh-water conditions. In S. Europe, Caucasus, Asia Minor, N. Africa, through Persia towards China and Japan, great thickness (several thousand feet) of limestone developed, made up in places largely of the fossilised shells of large disk-shaped foraminifera (nummulites). Volcanoes were active in eocene times, old lavas and other forms of rock being found in Antrim, the inner Hebrides, Apennines, and western U.S.A., Tasmania, etc.

The forerunners of nearly all kinds of animals now living appeared in eocene times. The early ancestors of the horse had then five toes; small, pig-like, marsh-dwelling animals in Africa represented the original stock from which elephants came. Placental mammals appeared in great numbers. Crocodiles and toothed birds lived in a sub-tropical estuary where London now stands. Important areas of eocene deposits are known as London, Hampshire, and Paris basins. Various beds in the London basin, in order of succession, are Thanet Sands (at base), Woolwich and Reading Beds, Blackheath Pebble Bed, London Clay, Bagshot Sands; total thickness about 970 ft. Those of the Hampshire basin are much thicker, and slightly different: no Thanet Sands at base, great development of Barton Beds at top, and Bracklesham and Bournemouth Beds in the middle.

**Eolith** (Gr. *eōs*, dawn; *lithos*, stone). Stone implement of ruder workmanship than those of the Palaeolithic Age, so called in 1892 by J. Allen Brown. Theoretically the Chellian hand-axe had a long antecedent history, back to the time when primeval man, or even his anthropoid precursors, first employed unwrought stones as tools. Many such flints have been found, notably at Ightham, Kent, and in the Ipswich Red Crag, for which human use is claimed. A characteristic hawk-beak form (rostrocarinate) is regarded by Ray Lankester as ancestral to true palaeoliths. The eolith stage of industry was traceable in modern savagery among the Tasmanians. See *Stone Age*; consult also *Pre-Palaeolithic Man*, J. P. Moir, 1920; also illus. facing p. 458.



**Eon de Beaumont, CHARLES** (1727-1810). French diplomatist. Born Oct. 17, 1727, he entered the



**Eon de Beaumont,**  
French diplomatist

army in 1755, and in 1757, having attracted the attention of Louis XV, was sent, disguised as a woman, on a diplomatic mission to Russia. In 1762 he came to England, where in a fit of pique he published certain libels, for which he was convicted in 1764 and outlawed. The question of his sex had aroused such controversy that heavy bets were made and gambling policies of assurance effected. General opinion declared him a woman, and Eon took no steps to decide the matter. He returned in 1777 to France, where he lived as a woman, but came back to England in 1785, and ten years later, having lost everything in the French Revolution, dressed as a woman he gave an exhibition of fencing in London, where he died, May 21, 1810. See *Historical Mysteries*, A. Lang, 1904.

**Eos.** In Greek mythology, goddess of the morning. She is identified with the Latin *Aurora* (*q.v.*).

**Eosin.** Scarlet-coloured aniline dye prepared by the action of bromine upon fluoresceine. It occurs as dark brown crystals with a green metallic lustre, different strengths and shades of colour being distinguished commercially by the addition of letters, *e.g.* A, GGF, DH. The colour, although not fast, is much used for dyeing silk and other fibres. See *Dyes*.

**Eöthen** (Gr., from the East). Travel book by A. W. Kinglake, first published in 1844 with the full title of *Eöthen: or Travels Brought Home from the East*. A most engaging book, it describes the author's journeyings from Belgrade to Constantinople and Cairo, and through Palestine.

**Eötvös, JOZSEF, BARON** (1813-71). Hungarian novelist and statesman. He was born Sept. 3, 1813, at Buda, and educated at the university there. After travelling extensively in Western Europe, he returned to Hungary, and in 1838 produced his novel *The Carthusian*, a sentimental study of a wealthy young French count who retires from the world and becomes a monk. His second novel, *The Village Notary*, 1846, is an attack upon serfdom and other evils. His *Hungary in 1514*, an historical

romance describing the great peasant rising under Dozsa, and the terrible vengeance taken by the nobles, appeared in 1847. The Influence of the Leading Ideas of the Nineteenth Century upon the State (1850-54) is an attempt to show how far it is possible fully to realize the doctrines of liberty, fraternity, and equality. Eötvös was twice minister of public instruction, in the first Hungarian ministry of 1848 and in the Andrassy ministry of 1867. He died at Buda, Feb. 2, 1871.

**Eozoon** (Gr. *eös*, dawn; *zoon*, animal). Name given to mineral structure consisting of thin wavy layers of white calcite and green silicate (serpentine), curiously intergrown, and resembling structures of certain lowly organisms (foraminifera). Found in the earliest formed rocks in Canada, it was formerly regarded as of organic origin, formed by Rhizopods.

**Epacris** (Gr. *epi*, on; *akris*, top). Genus of shrubs of the natural order Epacridaceae. Natives of Australasia, they have scattered leaves and abundant, cylindrical, bell-shaped flowers produced singly



**Epacris.** Leaves and flowers of *Epacris nivalis*, an Australian shrub

from the axil of a leaf. They are largely grown in European greenhouses, and many varieties and hybrids have been produced.

**Epact** (Gr. *epaktos*, brought on, added). Number of days by which the solar year exceeds the lunar year, or the excess of a calendar month over a lunar month. The excess of the solar year is about 11 days. Should a new moon fall on Jan. 1, the epact of the ensuing year would be zero or 0. On Jan. 1 of the calendar year following the epact would be 11. The number is increased accordingly until, at the end of the lunar cycle, 19 years, the moon's aspects begin to be repeated. As the moon's age cannot exceed 30 days, the epact 22, *e.g.*, would be followed by 3, thus: 22+11=33-30=3. The epact for 1901

was 10; for 1920, 10. See *Calendar*; *Chronology*; *Golden Number*; *Lunar Cycle*; *Solar Cycle*.

**Epaminondas** (Gr. *Epameinondas*). A Theban general and statesman. Born about 418 B.C.,



**Epaminondas,**  
Theban general

although of aristocratic family, his early life was spent in poverty. He first came forward as a man of outstanding ability at the battle of Leuctra (371), when he was chiefly responsible for the great defeat inflicted on the Spartans which brought to an end the Spartan hegemony over Greece. Epaminondas determined to follow up his victory and to break the power of Sparta in Peloponnesus, her particular stronghold. With this object, he united the cities of Arcadia in a league, with the new city of Megalopolis, founded by himself, as the capital. As part of the same policy, Messenia, which had been for three centuries under the heel of Sparta, was made into an independent state. Dissension, however, arose in the new Arcadian league, some of its members inclining towards Sparta. In 362 the Spartans sent an army into Arcadia, which was defeated at the battle of Mantinea, but Epaminondas fell in the battle. During his lifetime, Epaminondas had raised Thebes to be the leading power of Greece, but the hegemony did not last after his death.

**Epaulette** (Fr., little shoulder). Shoulder ornament worn by officers of the British Navy and bearing the marks that indicate their rank. Lieutenants and superior ranks wear fringed epaulettes. The British Army abolished epaulettes in 1855, but they are worn in many foreign armies, as well as in navies.

**Epee Club.** London club for the practice of fencing and swordsmanship. It was founded in 1900, just after the holding in England of the first open epee tournament for amateurs. Before the Great War, international tournaments were held under its auspices, and these were revived in 1919. See *Fencing*.

**Epéhy.** Town of France, in the dept. of Somme. It lies 13 m. S. by E. of Cambrai. It was captured by the British April 1, 1917, and was one of the places where there was heavy fighting in the German counter-attack, Nov. 30, 1917, in the Cambrai (*q.v.*) sector. Retaken by the Germans, Mar. 22, 1918, it was captured by the British in Sept., 1918, in the battle of that name.

**Epéhy, BATTLE OF.** Fought between the British and the Germans, Sept. 12-25, 1918. After the severe German defeats by the British armies in the battles of Bapaume and Arras, Ludendorff decided to fall back to the Hindenburg Line, confident that his troops would be able to hold this gigantic fortress system in the face of any attack through the winter of 1918-19. Sir Douglas Haig was equally confident that the line could be captured. But before delivering the

Havrincourt and Trescault, which was begun by the 3rd British army on Sept. 12. Both villages were taken on that day, and a determined German counter-attack on Sept. 13 was beaten off at Havrincourt. Meantime the Australians captured Jeancourt, and on Sept. 17 the 9th corps on the extreme British right fought its way into Holnon, where a struggle continued for some days with doubtful result for the possession of the village.

The main battle was timed to open at 5.20 a.m. of Sept. 18 and, as in the first battle of Cambrai and the battle of Amiens, the infantry was to advance without any preliminary bombardment and to deliver a surprise attack, covered by a creeping barrage. The Germans expected attack, but were not certain of the exact date or time; as the British troops advanced to the assembly points, a heavy gas-barrage was put down by the German guns; and two hours before the moment for the advance rain began to fall and the weather became thick and unfavourable.

On the extreme British left the 3rd army beat off a determined German attack at Havrincourt. The 3rd corps cleared Pezière, Epéhy, and Ronssoy, but was held up at Lempire and could not reach its objectives. In the centre the Australian corps under Gen. Monash advanced with great dash and initiative, broke through the German front over an extent of 5,000 yards, and pushed rapidly forward to a depth of nearly four miles through the fortified zone, taking Hargicourt and Villeret, and forcing its way into the outer defences of the main Hindenburg Line, where it established itself firmly about 1 m. W. of Bellicourt. To the south of them the 9th corps was held up at Fresnoy-le-Petit and in the Quadrilateral; but the village of Berthaucourt was stormed.

On Sept. 19 the 3rd corps made an advance of about a thousand yards towards Vendhuille. The 36th French corps, south-east of Holnon, could not get forward, but Holnon village was captured at last by the British after a three days' struggle in which it had changed hands repeatedly. On Sept. 20-22 the 3rd corps reached the positions which had to be attained before a direct attack was delivered on the Hindenburg Line. On Sept. 24 the 9th corps attacked once more at Fresnoy-le-Petit and in the Quadrilateral. The German gas-shelling was exceedingly violent, but Fresnoy and Gricourt were taken, and the French south-east of Holnon advanced some distance. On Sept. 25 the Quadrilateral was in British

hands, and all the ground needed for the attack on the Hindenburg Line had been secured.

This battle was fought on the British side with very limited resources, but all the objectives were attained and 100 guns and 11,750 prisoners were taken from the Germans on the British section of the front. In all, 14 British divisions were engaged against 15 German. The British success was the more notable because it was won by troops that had been fighting almost continuously for seven weeks and in that time had suffered casualties totalling 72,000. See Cambrai, Battles of.

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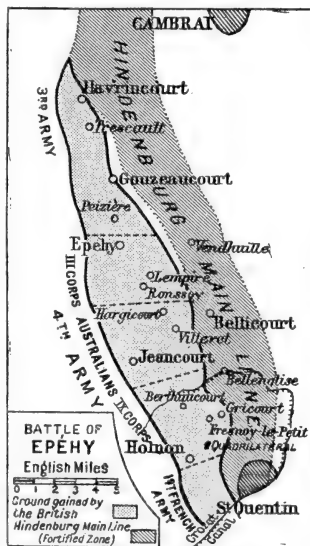
**Eperjes, EPERIES OR PRESSOW.** Town of Czechoslovakia, formerly in Hungary, capital of the comitat of Sáros. It stands on the Tarcza, a tributary of the Theiss. 25 m. W. of Leutschau. Encompassed by walls, the town is well planned, with fine streets, gardens, and buildings, including an 18th century cathedral. A thriving trade is carried on in pottery, beer, grain, wine, cattle, and linen goods. The seat of a Catholic bishop, it possesses an academy of law and theology. There are mineral springs and opal mines in the neighbourhood. Pop. 16,323.

**Épernay.** Town of France, in the dept. of Marne, about 19 m. W.N.W. of Châlons-sur-Marne. It



Épernay arms

has important industries, including spinning, tanning, cork and cask making, and brewing, but its chief importance is its connexion with the champagne industry, the wine being stored in cellars hollowed out of the chalk rock. In normal times about 5 million bottles are laid down annually. The town was occupied for a brief period by the Germans in the early stages of the Great War, and came into prominence later, being one of the German objectives in the second battle of the Marne, July, 1918. The assistance of the British divisions, composed of Yorkshiremen and Highlanders, in the defence of Épernay, was specially recognized by Gen. Berthelot. Pop. 21,800. See Marne, Battles of the.



Epéhy. Plan of the battlefield showing the ground gained by the British in the battle of Sept. 12-25, 1918

decisive attack upon it, its advanced positions and outworks had to be taken.

For this purpose the battle of Epéhy was fought, in very difficult country. A fortified belt three miles deep had to be traversed before the main Hindenburg Line could be reached, and several subsidiary lines of defences had to be taken. The British forces operating were troops of the 3rd army under Sir Julian Byng on the left, and of the 4th army, including the Australian corps, under Sir Henry Rawlinson on the right, with the 36th French corps, forming part of Debény's 1st French army on the extreme right, operating south of Holnon. The German forces engaged were troops of the 2nd and 18th German armies, forming part of von Boehn's army group, and they included several crack corps, among them the Alpine corps and the 2nd Guards division.

The first operation was the attack on the German positions at

**Ephah.** In the O.T., name for the first in order of the sons of Midian (Gen. 25; 1 Chron. 1; Isaiah 60); concubine of Caleb in the line of Judah (1 Chron. 2); son of Jahdai (1 Chron. 2). The word, of Egyptian origin, was adopted as the name of a Hebrew dry measure which corresponded to the *bath* in liquid measure. See *Weights and Measures*.

**Ephelis** (Gr.). Pigmented spots appearing on the skin after exposure to the sun. See *Freckles*.

**Ephemera** OR MAY FLY (Gr. *ephmeros*, living only for a day). Family of neuropterous insects, with a long, ten-jointed abdomen terminating generally in three long processes resembling bristles. The eyes are large and compound, the wings lace-like, and the mouth parts undeveloped, as the perfect insect does not eat. The larval stage is passed in the water, where the insect usually feeds on the vegetation, though some species are carnivorous, and prey on small aquatic animals. The perfect insects

Epistles of the Captivity, because they seem to have been written, probably, between A.D. 61 and 63, during S. Paul's first imprisonment in Rome. It was probably intended to be a circular letter, and was not addressed particularly to the Ephesians. It contains no personal greetings to the friends of the apostle, and in the two best Greek MSS. the words "in Ephesus" ("to the saints which are in Ephesus") are omitted. Moreover, Marcion speaks of it as the Epistle to the Laodiceans.

Its connexion with the Epistle to the Colossians is so close that the one is sometimes supposed to be an expansion of the other, but such a supposition is unnecessary. The external evidence for the authenticity of the epistle is sufficient, if not conclusive. As regards internal evidence, the fact that the language and thought differ somewhat from those of other Pauline epistles has caused difficulties, but these are by no means insuperable. The circum-

stances that impel a writer to take up the pen, the mood in which he writes, are not always the same, and, in the interval between the writing of one epistle and another, the language and thought of S. Paul may have undergone considerable development as a result of his experiences.

**Ephesus.** Ancient city of Asia Minor, situated on the Cayster (Gr. *Kā-ystros*), near its mouth. It was the chief of the twelve Ionian colonies of Asia, and was founded probably about 1000 B.C. In the 6th century it fell, with the other Greek cities of Asia Minor, under the dominion of Croesus, king of Lydia, and later under that of Cyrus the Great, king of Persia. During the Athenian hegemony it paid tribute to Athens, but about the beginning of the 4th century B.C. it again passed under Persian rule. When Persia was overthrown by Alexander the Great, it acknowledged the Macedonian supremacy, and eventually, after the Roman conquest of Greece, became the administrative capital of the Roman province of Asia.

Ephesus was noted for the worship of Artemis or Diana; its temple to the goddess was regarded as one of the seven wonders of the ancient world. The city was visited by S. Paul on his second and third journeys, and was an early seat of Christianity. Ephesus was the birthplace of the philosopher Heraclitus. There are ruins of a theatre (Acts xix, 27), a stadium or racecourse, an odeum or hall in which musical and poetical contests took place, and the temple of Artemis. See *Discoveries at Ephesus*, J. T. Wood, 1877; *Excavations at Ephesus*, D. G. Hogarth, 1908.



emerge about the end of May in most species, and their life is very short. The name suggests that the insect lives only for a day, but some examples live only for a few hours, while others survive several days if the weather is favourable. About fifty species of may fly are found in Great Britain, and are in great favour with anglers for bait. See *Insects*.

**Ephemerides** (Gr., journals). Table or tables showing the predicted positions of a heavenly body for every day during a given period. These are right ascension, declination, horizontal, parallax, semi-diameter, in the case of the moon and planets; equation of time, in the case of the sun, etc.

**Ephesians, EPISTLE TO THE.** The first of the group of Pauline epistles commonly known as the



Ephesus. Ruins of the city viewed from above the theatre, looking towards the sea. In the foreground, ancient main street; in the distance the Prison of S. Paul, on the hill top. Above, remains of later temples in the Artemisium

**Ephesus**, COUNCILS OF. Six important councils of the Church held between the 2nd and 5th centuries. The first took place A.D. 197, on the question of the date of the observance of Easter; and the second in 245, against the heresy of Noëtus.

The third council, 431, was the third ecumenical council of the Church, and dealt especially with the Nestorian controversy on the person of Christ (*see* Nestorians). Cyril, archbishop of Alexandria, had denounced Nestorius, and the emperors Theodosius and Valentinian convoked a general council to decide the matter. The council confirmed the Nicene Creed, condemned the heresy of Nestorius, and also settled certain points of discipline. The fourth council, 440, and the fifth, 447, met to decide a question of episcopal succession. The sixth or robber council, convened by Theodosius in 449, dealt with disputes about individual bishops and clergy, but its general findings were tainted by outside influences and were superseded by the council of Chalcedon in 451.

**Ephialtes** (d. 456 B.C.). Athenian statesman and democratic leader, who opposed Cimon (*q.v.*), the leader of the aristocratic party, and was associated with Pericles. Among the reforms of Ephialtes was the limitation of the power of the Areopagus. He is not to be confused with the traitor of the same name who, when Leonidas and his Spartans were defending the pass of Thermopylae in 480 B.C. against the Persians, showed the enemy a path whereby the defenders of the pass could be taken in the rear. In Greek mythology, Otus and Ephialtes were giants, who rebelled against the gods, and endeavoured to pile Ossa on Olympus and Pelion on Ossa. *Prom. Effi-alteez.*

**Ephod**. Symbolical waistcloth worn by the Jewish priests when officiating. That worn by the high



Ephod. Jewish high priest wearing the ephod, shown knotted below the breastplate

priest was of fine linen, coloured gold, blue, purple, and scarlet, worn over a blue robe, fastened round the body by a girdle, and supported by two shoulder-straps, each ornamented with an onyx stone inscribed with the names of six of the 12 tribes. Attached to the front of it was

the breastplate (*q.v.*). References are made in Exodus 28, 29, 39; Lev. 8; Judges 17; 1 Sam. 2 and 22; 2 Sam. 6.

**Ephor** (Gr. *ephoros*, overseer). Spartan official. Originally appointed by the kings to take over certain police and judicial duties, the ephors gradually became the most influential body in the state. After the second Messenian War (685-668 B.C.), they became an independent magistracy. Five in number, and elected by the Apella (the Spartan general assembly), they held office for a year. They possessed civil jurisdiction, looked after public morals, had the right of dismissing, fining, and imprisoning public servants, and even the kings were subject to their authority. Two of them accompanied the king in the field to keep a watch on his movements. They summoned and presided at the public assemblies, controlled the finances, and conducted negotiations with the representatives of foreign powers. When Agis IV tried to limit their authority, he was imprisoned by their order, and murdered (240). The ephorate was abolished by Cleomenes III, but restored after he lost the throne in 221, although it never recovered its former position. *See* Sparta.

**Ephraem Syrus** OR **EPHRAIM THE SYRIAN** (c. 306-378). Theologian and sacred poet. A native of Nisibis, where he spent his youth in study, about the year 363 he removed to Edessa, where he lived the life of a hermit, and was ordained deacon. He devoted his life to teaching and writing, and assisted the poor during a great famine.

**Ephraim**. Second son of Joseph. With his brother, Manasseh, he was adopted by their grandfather Jacob, and their descendants were reckoned among the tribes of Israel. Ephraim took precedence of his elder brother Manasseh, but nothing is known of his personal career. The tribe of Ephraim occupied part of the northern territory of Palestine. Joshua belonged to this tribe.

**Ephrath** OR **EPHRAATHAH** (fruitful). Old name for Bethlehem (*q.v.*), in Palestine.

**Epiblast** (Gr. *epi*, on; *blastos*, shoot). Term used in embryology for the outer covering of the organism when it has reached the stage of a sac or gastrula. It is sometimes referred to as the ectoderm, the exterior germinal layer of a developing embryo in an early stage. *See* Embryology.

**Epic** (Gr. *epos*, tale, song). Name given to narrative poetry which deals in dignified and elevated style with some important action,

usually heroic. The great examples are the Iliad and Odyssey of Homer, which are unmatched in any other language. Other peoples and later ages, however, produced poetry descriptive of great events to which the term epic has been generally and legitimately applied, such as the French Song of Roland and the English Beowulf. These all belong to the authentic, as distinguished from the literary, type, that is, they are "poems of growth," not the work of a single age or author, but stitched together by generations of bards from the myths and traditions of their race, embodied in older and more primitive lays and ballads. Such poems are important as historical documents. Though mingling fiction with fact, they preserve irreplaceable accounts of the manners and customs, and the political, social, and religious ideas of times otherwise unchronicled.

#### English Epics

Beowulf, for example, raises the curtain which hides the early life of our forefathers, and in its persons, scenes and episodes reveals many of the mental and moral characteristics of the race, as well as elements of the social order which still prevails in the British islands. Several other narratives which fall short, indeed, of the unity and completeness of the more famous heroic poems, still display many of their essential features, like the English Maldon, a splendid though comparatively late piece of the 11th or 12th century. Rhymed chronicles like Layamon's Brut partake of the epic character in that they contain fragments of actual history and are heroic in scope and intention, but deficient in plan and insufficiently elevated in style to bear comparison with the Iliad or Paradise Lost. Paradise Lost belongs, like Virgil's Aeneid or Tasso's Gerusalemme Liberata, to the artificial, invented or literary type. These are imitative poems, written in the epic manner by learned authors in epochs of advanced civilization. They are the works of bookmen, who describe events of which they had no personal knowledge and their value and interest rest wholly upon the imagination and poetical skill at work in their construction.

Few such attempts were greatly successful; nevertheless, since they followed the tradition and endeavoured to treat a noble subject worthily, they are properly to be styled epic. The Renaissance, on the other hand, produced many chivalric and romantic narratives, of epic dimensions certainly, like those of Ariosto and Spenser. Some are humorous, some serious, but

even when serious, and however charged with poetic quality—since they forsook the region of the heroic, of events that might have happened, for the region of the symbolic, marvellous or incredible—have little in common with the true and original types. In the mock-heroic, like the classical *Batrachomyomachia*, or *Battle of the Frogs and Mice*, or *Pope's Rape of the Lock*, the manner and machinery of epic poetry are imitated, the great style applied to the trifling subject, with humorous intention or for the purposes of parody or burlesque. In modern times probably the nearest approach to the epic spirit is realized in *The Dynasts* of Thomas Hardy. See *Poetry*.

**Epicarmus** (c. 560–470 B.C.). Greek comic poet. Born at Megara in Sicily, he lived there until its destruction in 483, when he removed to Syracuse, where he enjoyed the patronage of the "tyrants" Gelo and Hiero. The chief representative of the Dorian or Sicilian comedy, his 35 plays written in the Doric dialect, of which only scanty fragments remain, dealt chiefly with mythological subjects (*Busiris*, the shipwrecked *Odysseus*, the *Sirens*). They were distinguished by rapidity of action, in which, according to Horace, they served as a model for Plautus.

**Epictetus**. Stoic philosopher who lived about 100 A.D. Born at Hierapolis in Phrygia, he was taken as a slave to Rome. Having been given his freedom, he became an adherent and teacher of Stoicism, and when Domitian expelled the philosophers from Rome, Epictetus removed to Nicopolis in Epirus, where he lived until the reign of Hadrian. One of his pupils, Arrian the historian, published his *Discourses* and a *Manual* of his doctrines. The latter and four books of the *Discourses* are extant. According to Epictetus, we are only concerned with things that are under our control; all other things are *adiaphora* (indifferent). The good is that which corresponds to reason and the general moral ideas implanted in us; the bad is that which runs counter to them. The highest principles of life are patience, abstemiousness, and self-control. Epictetus assumed the existence of *daimonia*, spirits which, like that of Socrates, accompanied man everywhere and acted as his guardians through life.

**Epicureanism**. The doctrines of the school founded by the Greek philosopher Epicurus (341–270 B.C.). He was of Athenian parentage, and born in Samos. Coming to Athens, he founded his school

in his Garden, which became as famous as the Stoic Porch about 306. Epicurus divided philosophy into three parts: *Canonic* (logic, the theory of knowledge), *Physics*, and *Ethics*. The basis of all knowledge is the evidence of sensual perception; all perceptions are true and irrefutable. Opinions are true or false, according as they are confirmed or refuted by perception.

In physics Epicurus agrees in the main with Democritus, the founder of the atomic theory. Bodies are formed by the collision and combination of an infinite number of atoms in infinite space. The number of worlds also is infinite. The gods, made of the finest atoms, do not trouble about the world or human affairs, but live happily in the empty spaces between the different worlds. The soul is material, made up of the finest atoms dispersed throughout the body. There is no such thing as immortality; after death the soul-atoms are scattered. Sensation is due to effluxes and images, which issue from the surface of things and pass through the air to the sight or understanding.

In ethics Epicurus follows the Cyrenaics. Pleasure is the aim of life, the only happiness. No pleasure is bad in itself, but only pleasure in rest—freedom from pain—is a true good. The virtuous man, he who rightly pursues pleasure, is alone happy. In modern language, Epicureanism is used for addiction to sensual enjoyment, more particularly that of the table. See *Ethics*; *Philosophy*.

**Epicycle** (Gr. *epi*, upon; *kyklos*, circle). A circle, the centre of which moves along the circumference of a greater circle. In Ptolemy's system of the heavens each of the "seven planets" was supposed to revolve in an epicycle. This obsolete explanation describes with approximate truth the relative motion of a planet with regard to the earth, if the earth is assumed to be stationary.

**Epidauros**. Town of Argolis, ancient Greece, situated on the Saronic Gulf. It was famous for its temple of Asclepius (*Aesculapius*), the god of healing, about 8 m. distant, which was extensively visited by the sick from all parts of Greece. Miraculous cures similar to those at Lourdes are recorded. Excavations carried on since 1881 have revealed remains of the temples of Asclepius and Artemis, of a tholos or rotunda, and inscriptions connected with the worship of Asclepius.

**Epidemic** (Gr. *epi*, in; *dēmos*, people). Occurrence of a disease among a number of persons about

the same time. When a disease is continually present in a locality the term endemic is usually employed. A pandemic is an outbreak of a disease which extends over the whole or a large part of the world. In the Middle Ages, when sanitation was still in its infancy, epidemics were of frequent occurrence and were usually regarded as manifestations of divine wrath. Later the communicability of the disease from one person to another was recognized, and the cause of the outbreak was looked for in climatic occurrences or cosmic phenomena—for example, the influence of a comet.

#### How Epidemics are Spread

In the 18th and 19th centuries more scientific views were gradually established, and it was recognized that the disease was conveyed from one to another by some virus or poisonous agent, which was eventually found in most cases to be a bacillus or other micro-organism. Epidemics are spread by various agencies. Pollution of drinking water by sewage has been the commonest cause of outbreaks of cholera and typhoid fever. Epidemics of diphtheria have frequently been spread by contaminated milk. In other cases insects or animals have been the transmitting agent. Typhus-fever, for example, is conveyed by the bite of the louse, and plague by the rat flea. Airborne infection is probably the method of transmission of influenza, and possibly of scarlet fever and small-pox. Epidemics may also be caused by the wholesale contamination of food with poisonous substances. In 1900 there was an epidemic of arsenic poisoning in the N. of England due to the contamination of beer with arsenic derived originally from arsenical iron pyrites from which sulphuric acid used in the manufacture of the beer had been made. Epidemics of lead poisoning have also followed the contamination of drinking water by lead derived from cisterns and conduit pipes.

#### Measures of Prevention

The prevention and arrest of epidemics necessitate active measures which vary with the particular circumstances controlling the disease. Often a system of notification of affected persons, followed by their isolation, is important. This is only possible in advanced communities and where the severity of the disease justifies the course and the numbers are not too great to cope with. It could be followed, for example, in this country during outbreaks of small-pox, but it could not be done



for influenza. Search must be made for any causative factor, particular attention being paid to the purity of food and drinking water. Accumulations of filth or rubbish should be removed. In fact, cleanliness both of habitation and person is an important feature in the prevention of epidemics. See Plague; Public Health.

**Epidendrum** (Gr. *epi*, on; *dendron*, tree). Large genus, mainly of epiphytes, of the natural order Orchidaceae. They are natives chiefly of S. and Central America



Epidendrum. Flower bud and leaves

and the W. Indies. They have leathery, strap-shaped leaves, and flowers solitary or disposed in spikes and sprays. The characteristic features of the genus are the union (more or less complete in different species) of the fleshy base of the lip to the column, a passage at the base of the lip, and the four compressed pollen-masses. Some of them have handsome flowers, but in many species these are of a dingy green hue.

**Epidermis** (Gr. *epi*, on; *derma*, skin). Name for the superficial layer of the skin, lying above the *cutis vera* or true skin. It is formed by a number of layers of cells, the most superficial of which consist of stratified epithelium, and are horny in character. These form the thickest part of the epidermis. Beneath the horny layers are several layers of clear rounded cells forming the *stratum lucidum*; next is a layer of granular cells, the *stratum granulosum*. In these strata the change from protoplasm to horny material takes place. The deepest layers constitute the *rete mucosum* or Malpighian layer, and consist of soft protoplasmic cells. The epidermis grows from the deeper layers, the superficial horny cells being continually shed. It has no blood vessels, but fine nerves ramify in the deeper layers. See Anatomy; Skin.

**Epidiascope** (Gr. *epi*, on; *dia*, through; *skopein*, to look). Apparatus of the optical lantern type.

Originally intended for projecting on to a screen images of opaque bodies such as insects, coins, diagrams, etc., in their natural colours, it may also be used for projecting transparent objects, e.g. lantern slides and microscopic preparations may be shown with considerable magnification. The illumination is obtained from an arc lamp located at the focus of a parabolic mirror; the light is thrown upon, or transmitted through, the object by a system of condensers and mirrors. Means are provided to effect the change over from transmitted to reflected light, or vice versa.

**Epididymis** (Gr. *epi*, on; *didymos*, testicle). In anatomy, a convoluted tube which receives the ducts from the testicle, and is prolonged into a tube, the *vas deferens*, through which semen passes to the urethra.

**Epidiorite** (Gr. *epi*, on; *diorite*). Crystalline rock much altered by metamorphism. It is composed of the minerals hornblende and feldspar, and sometimes a little quartz. Hornblende is the result of alteration of augite in the original rock, the feldspar is granular, and all constituents rearranged. It occurs as large intrusive sheets with schists in the Scottish highlands and N. Ireland. See Diorite.

**Epidote** (Gr. *epi*, on, besides; *dotos*, given). Hydrous silicate of calcium and aluminium. It is found abundantly, but outside Austria and America is rarely of sufficient transparency and fine colour to be cut as a precious stone. The colour ranges from green to brown. Its specific gravity is from 3.25 to 3.5; it stands low in the scale of hardness. Piedmontite is a manganese epidote found in Piedmont, some valued specimens being characterised by a magnificent cherry-red colour. Epidote is so called because the base of the primary crystals is enlarged in some of the secondary forms.

**Epiastrium** (Gr. *epi*, on; *gaster*, belly). Upper central portion of the abdomen, or pit of the stomach.

**Epigenesis** (Gr. *epi*, on; *genesis*, generation). Term used in biology to express the development of an organism as the result of the growth and subsequent differentiation of a single germ-cell into the complicated tissues of an individual. This takes place by the segmentation or division of the fertilised cell. See Biology; Cell; Reproduction.

**Epiglottis** (Gr. *epi*, on; *glossa*, glotta, tongue). Thin leaf-shaped structure, consisting of fibro-cartilage, placed behind the root of the tongue and in front of the superior

opening of the larynx. It was formerly supposed that it was bent back during the act of swallowing and served as a lid to close the larynx; but it is now recognized that the closing of the glottis is effected by the arytenoid and thyro-arytenoid muscles.

**Epigoni** (Gr. descendants). In Greek legend, the sons of the seven heroes who fell in the war against Thebes. See Adrastus.

**Epigram** (Gr. *epi*, upon; *gramma*, a writing). Originally a simple inscription attached to religious offerings. It was afterwards written on the temple gate, and by easy transition passed to other public edifices and to statues of gods, heroes, and all who had distinguished themselves by patriotism, courage, and virtue. The term at first included inscriptions in verse or prose, and the form was employed by legislators and philosophers to convey any political or moral precept, its brevity impressing it readily upon the memory. Finally, among the Greeks, the epigram came to signify any short piece of poetry which conveyed a single idea with neatness and grace. The Greek Anthology contains epigrams characterised by delicacy and truth of sentiment, and by elegance of expression, and entirely devoid of satire, play upon words, and even of conceit. Even in the lighter convivial epigrams the thought is generally of a melancholy cast, and the sepulchral inscriptions are remarkable for their simple delicacy and their perfect appropriateness.

In the hands of the Latin epigrammatists the epigram acquired a new character. The term was

now applied to any brief and concise composition in prose or verse, in which a single idea was expressed and



the point made by antithesis, surprise, or play upon words. Catullus and Martial are the acknowledged masters of the Latin verse epigram, Tacitus of its prose equivalent. Despite much conceit and some obscenity Catullus excelled all other Roman



Epiglottis seen from the front. Above, sectional diagram showing position of this structure in the throat



wits in elegance and beauty, while Martial stands supreme in wit and fecundity, in brevity, smartness, and variety. His greatest fault is his licentiousness. As used by Martial, and in the modern sense, the verse epigram has been defined as a short poem, generally of a personal character, meant to vex somebody, to pay off an old score, or to be smart at someone else's expense. In the best examples the point is made unexpectedly in the last word, wherefore the epigram has been compared to the scorpion because "as the sting of the scorpion lyeth in the tail, so the force and virtue of the epigram is in the conclusion."

Of modern literatures the Italian contains the nearest approximations to the Greek epigram in respect of feeling, though not of simplicity, in the softly melodious, elegant, and pathetic songs of Metastasio and the amatory verse of Guarini, Tasso, and others, while Pananti, in the early 19th century, wrote many epigrams notable for their causticity, political allusion, and boldness. The French madrigal is sometimes written in the spirit of ancient Greece, and is often unequalled in condensation of thought, happiness of epithet, and delicacy of turn. Voltaire, however, is the supreme French epigrammatist, the author of an immense number of epigrams on every conceivable subject and of every degree of merit.

English literature is deficient in the serious and tender style of epigram, but singularly rich in the witty and satirical. The 18th century was the flowering time of the English verse epigram, which was admirably suited to the malicious wit of Pope, the whole of whose poetry, indeed, is a string of epigrams. As epigrammatist, he stands head and shoulders above all other English poets. While, owing to their vagueness and inappropriateness, his epigrams are notoriously bad, his epigrams are of the highest polish and point. His epigram on epitaphs, addressed to Dr. Robert Freind, headmaster of Westminster School, may fitly be adduced:

Freind, for your epitaphs I'm grieved;  
Where still so much is a id,  
One h. if will never be believed,  
The other never read.

**Epigraphy** (Gr. *epi*, on; *graphein*, to write). Study of inscriptions. In practice it concentrates upon inscriptions on durable materials such as stone, metal, and wood, including coins, gems, ornaments, seals, vases, and weapons, whereas palaeography studies the forms of writing upon papyrus, parchment, and paper. When concerned with

form it is a branch of palaeography, but in addition it deals with subject-matter. Important departments are Chinese, Greek, Hittite, Latin, Indian, Runic, and Semitic epigraphy. See Inscriptions; Palaeography.

**Epilepsy** OR FALLING SICKNESS (Gr. *epilepsis*, seizure). Disease of the nervous system characterised by periods of unconsciousness. Two forms are recognized: *petit mal*, or minor epilepsy, in which convulsions do not occur; and *grand mal*, or major epilepsy, marked by the occurrence of convulsions or fits. Epilepsy most commonly begins in childhood, before the fifth year, and the first indication of the disease after thirty is very exceptional. The fundamental cause of the disease is unknown, though fright, injury, alcoholism, and an attack of illness sometimes appear to be exciting causes. Hereditary influences play a part, the offspring of those who suffer from insanity or neurasthenia being rather more prone to exhibit epilepsy than other children. In *petit mal* the attacks of unconsciousness often last no longer than a few seconds. The individual may suddenly stop talking and his eyes stare fixedly; after a few moments he resumes his conversation as if nothing had happened.

#### Symptoms of Grand Mal

*Grand mal* is characterised by the occurrence of convulsive fits. In many cases the subject has a preliminary sensation or *aura*, which warns him of what is going to happen. This may take the form of tingling or sensation of heat or cold in the limbs or face, flashes of light before the eyes, noises or voices in the ears, or uneasy sensations in the stomach. After an interval of varying duration the patient suddenly loses consciousness, and may fall to the ground without making any effort to save himself. Sometimes the beginning of the fit is marked by a loud cry. At first the muscles are rigid; the jaws are clenched, the limbs extended, and suspension of respiration causes blueness of the face. After a few seconds, violent convulsions occur; the limbs are jerked about, the muscles of the face twitch, and the tongue may be severely bitten. After one or two minutes the patient passes into a state of somnolence which may be succeeded by prolonged sleep. In severe cases fits may rapidly follow each other, and consciousness may not be regained in the intervals.

Masked epilepsy is a form in which the fits are replaced by attacks of delirium or outbursts of maniacal fury, during which the sufferer may commit crimes of

brutal violence or destroy himself. In another form there is loss of memory. A person may leave his home and wander about the country, behaving as a normal being, but having forgotten his previous life or even his name. After an interval his old self returns and he has no knowledge of what has happened in the interval.

Jacksonian epilepsy is a condition in which consciousness is not lost, and the spasms affect only part of the body. The condition is probably quite distinct from true epilepsy, and is the result of some irritation of the brain.

**TREATMENT OF EPILEPSY.** During an actual fit all that can be done is to prevent the patient from hurting himself. He should be allowed to remain in the recumbent posture, the clothes should be loosened round the neck, and a roll of cloth should be introduced between the teeth to prevent the tongue from being bitten. The most useful drugs in the treatment of epilepsy are the bromides of sodium and potassium. These should be given for a long period, possibly two years, the amount and frequency of the dose depending upon the severity of the condition, the age of the patient, and the manner in which he reacts to the treatment.

An epileptic should lead a quiet life. Alcohol should not be taken; meals should be light and moderate in quantity; and meat should not be eaten more than once a day. It is better for the patient to be at work or occupied, provided the occupation is not one which subjects him to danger if a fit occurs. When epilepsy develops in childhood, a thorough examination should be made of the child in order to eliminate any possible sources of reflex irritation such as adenoids, worms in the intestine, etc.

**Epilogue** (Gr. *epilogos*, conclusion, peroration). Short address in prose or verse frequently employed to round off a dramatic performance; sometimes in the form of an appeal to public favour for the play it followed, sometimes explanatory or even apologetic. Many of the plays of Shakespeare and other great dramatists were provided with epilogues. In the 17th and 18th centuries the epilogue was frequently written by a friend or patron of the playwright. The use of the epilogue, as of the prologue, went out of fashion before the close of the 19th century, except on special occasions. See A Study of the Prologue and Epilogue in English Literature from Shakespeare to Dryden, G. S. B., 1884.

**Epimenides.** Greek legendary priest and miracle-worker. A native of Crete and associated with the worship of the Cretan Zeus and Apollo, he was summoned to Athens in 596 B.C. to purify the city from the curse of Cylon (see Alcmaeonidae). He was the author of oracular and purificatory poems, and is supposed to be the "prophet" of S. Paul's epistle to Titus (i, 12), according to whom the Cretans were "always liars." Some regard him as an entirely mythical character. *Pron.* Epimeni-deez.

**Épinal.** Town of France. The capital of the dept. of Vosges, it is situated on both sides of the Moselle, 190 m. E.S.E. of Paris. It has various manufactures, and has long been noted for the production of pictures for children. It has extensive quays and promenades. With Belfort, Verdun, and Toul it formed, during the Great War, the first line of the French permanent defences along the lines of the Moselle and the Meuse. The fortress of Épinal was built after the Franco-Prussian War, and was one of France's most important works of defence. There is a monument to the French who fell in the war of 1870-71. In the Great War it remained in French hands, though it was threatened by the Germans in the first three months. Pop. 30,042.

**Épinay,** LOUISE FLORENCE PÉTRONILLE D'ESCLAVELLES D' (1726-83). French author. Born at Valenciennes,



Louise d'Épinay,  
French author  
After Liotard

March 11, 1726, she married in 1745 her cousin Denis de La Live de Bellegarde, who soon afterwards deserted her. Her charm and literary ability made her many

friends among writers of her day, J. J. Rousseau, Voltaire, Diderot, and Grimm among others. For Rousseau she built in 1756 the Hermitage, in the valley of Montmorency; the story of their intimacy is told in his Confessions, but after little more than a year they quarrelled. She died April 17, 1783.

Her chief writings were her Mémoires, published in 1818, a lively picture of her literary circle and Parisian society, the names being fictitious, and her Conversations d'Émilie, 1774, crowned by the French Academy, 1783.

**Epiphany** (Gr. *epiphainein*, to manifest). Festival of the Christian Church, celebrated on Jan. 6. The



Épinal. The town, looking up the Moselle towards the wooded Vosges Mountains

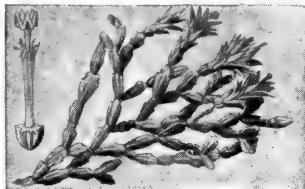
English Prayer Book title is The Epiphany, or The Manifestation of Christ to the Gentiles. Formerly the Epiphany seems to have been part of the festival of Christmas, which lasted twelve days. It commemorated the manifestation of Christ's birth to the magi (which in medieval times was associated with a mass of picturesque legends), the manifestation of the Trinity at Christ's baptism, and Christ's first miracle at Cana.

In the Greek Church the festival, a special day for baptism, is known as Epiphaneia, or showing forth.

In England on this day it was customary for the sovereign to offer gold, frankincense, and myrrh at the altar. Since the time of George III this offering has been made at the Chapel Royal, St. James's, by an officer of the royal household. *See* Calendar; Festival; Twelfth Day.

**Epiphora** (Gr., bringing upon, sudden attack). Persistent overflow of tears down the cheek, usually due to obstruction of the lachrymal duct. *See* Lachrymal Gland and Duct.

**Epiphyllum** (Gr. *epi*, on; *phyllo*, leaf). Small genus of climbing



Epiphyllum. Fleshy branches and flowers of *Epiphyllum truncatum*, a Brazilian cactus

sub-shrubs of the natural order Cactaceae. They are natives of Brazil. They have thin cylindrical stems, 2 ft. or 3 ft. high, with short, fleshy, leaf-like branches, whose broad ends produce large, showy flowers of pink or crimson hue.

**Epiphysis** (Gr., on-growth). Part of a bone which develops from a separate centre of ossifica-

tion and is at first attached to the main part of the bone by cartilage, which ultimately is replaced by bone. In the humerus, or upper arm bone, for instance, the upper end forms an epiphysis which is not united to the shaft by bony union until about the 20th year, and the lower end is another epiphysis which unites

about the 16th. *See* Arm; Elbow.

**Epiphytes** (Gr. *epi*, on; *phyton*, plant). Plants which, instead of being rooted in the soil, grow upon the surface of other plants, chiefly trees. Large numbers of the tropical orchids are of this character, and are therefore known as epiphytal orchids. Some ferns and mosses have the same habit. True epiphytes do not derive any of their nutriment from their hosts, and are therefore often called air-plants.

**Epirus** (Gr. *ēpeiros*, mainland). Country in the N.W. of ancient Greece. It was bounded by Illyria, Macedonia, and Thessaly on the N. and E., and by the Ionian Sea on the W. The original inhabitants were so-called Pelasgians, like those in other parts of Greece, but the Epirotes of historical times were a mixed race. The most famous king of later times was Pyrrhus (d. 272 B.C.), who seriously challenged the power of Rome. In Epirus was the celebrated oracle of Zeus at Dodona. The modern district includes part of southern Albania and northern Greece. In Nov., 1914, Greece occupied North Epirus, but in Nov., 1920, this occupation had not been recognized, nor the future of the country settled. Pop. about 250,000. *See* Albania; Greece.

**Episcia.** Genus of perennial herbs of the natural order Gesneriaceae. Natives of Central America and the West Indies, they have opposite leaves and beautiful funnel-shaped flowers. In colour they are white, flesh-tinted, lilac, vermilion, or crimson.



Episcia. Foliage and bloom of the American plant

**Episcopacy** (Gr. *episkopos*, overseer). Government by bishops. It is thus a particular type of Church government, as are Presbyterianism, Congregationalism or Independency, and Papalism. Any organized society must have a seat and organ of its authority over its members, and these the Christian Church began from the first to develop. The New Testament, however, by its reticence and ambiguities on the subject, indicates that constitutional questions were not of primary importance in the 1st century. The system of authority was, naturally, first modelled on that of the Jewish synagogue, with its board of elders. Later it conformed increasingly to the lines of Greco-Roman institutions, political and social, in which responsibility tended to settle in the hands of one representative official.

Bishops and elders appear concurrently in the New Testament, and, though the former title begins to attach to the presiding elder only, the whole board is at least once (Phil. i, 1) referred to as bishops. The position of Timothy and Titus appears to be exceptional, corresponding to that of Paul himself; among the functions of each is the appointment of bishops over local churches.

Early in the 2nd century the growing need of a centre of unity and source of discipline in each church led Ignatius to emphasise the local bishop as such, and so the importance of the presbytery, over which he presided, lessened. From the middle of that century the bishop is the representative and spokesman of each local church, and the appeal of Irenaeus, in his arguments with heretical sects and groups, to episcopal consensus, and to the continuity of the Christian tradition from bishop to bishop in certain churches, shows the development towards the monarchical episcopate. It remains, however, on a thoroughly democratic basis.

#### Consent of the Laity

The bishop was chosen by the church, and his powers as ruler were limited by the concurrent rights of his presbyters, in the appointment of whom the laity also had a decisive influence. The nominee of the local church had then to be recognized and "consecrated" by the bishops of the surrounding churches or dioceses, which gradually formed themselves into provinces under metropolitan bishops; and thus the system acquired that catholic, or world-wide, quality and range to which no rival system has ever attained.

To this day no bishop of the Church of England can ordain a

priest without the consent of the laity and cooperation of the other priests, i.e. presbyters, present, who all join in the laying on of hands; and the pope still addresses the bishops of his obedience as Venerable Brethren, though, since the Vatican Council of 1870, all idea of joint authority is gone.

The naturalness and convenience of the episcopal system are emphasised by the way in which some of the non-episcopal churches are developing a virtual episcopate; and the system prevailing in the Lutheran Churches of Germany and Scandinavia, the Moravian Church, and the Methodist Episcopal Church of America.

The historic episcopate may only imply that, in point of historical fact, the succession of bishops in a particular church goes back unbroken to the first bishops of all, or it may be pushed further to cover the claim that the whole value of episcopacy lies in this unbroken continuity, so that, where that is broken, even episcopal government does not produce real membership in the Catholic Church.

#### Apostolic Succession

The latter view rests on the assumption that the earliest bishops were the successors of the Apostles, and, like them, an order divinely appointed and apart, deriving their authority, not by delegation from the presbyters or the congregation, but from above, in the sense of from their predecessors. On this showing, valid consecration is crucial, and can only be performed by one who is himself in the Apostolic Succession, and therefore a recognition of non-episcopal bodies as churches endangers the chief powers and possessions, especially the valid sacraments, committed by Christ to the Apostles for the Church.

This view, however, is not that of the Church of England, nor yet is it that of modern scholarship. Lightfoot's assertion that "the Episcopate was formed, not out of the apostolic order by localisation, but out of the presbyterial by elevation," is endorsed by J. Armitage Robinson, in an authoritative volume, in which also C. H. Turner shows that the supposed connexion between the Apostolic Succession and the validity of sacraments only emerges in the 3rd century. What the historic episcopate really stands for, and helps to secure, is the unity and cohesion of the Church throughout time and space—from the 1st century onward, and across all six continents. The exclusive claims associated with the phrase tend to counteract the inclusive and reconciling influence of the ideal.

But such a document as the Report of the Lambeth Conference of 1920 marked a great advance on the part of the Church of England towards the broader and more ancient view. See Anglicanism; Church of England; consult also Essays on the Early History of the Church, ed. H. B. Swete, 1918.

E. A. Burroughs

**Episcopus**, SIMON (1583–1643). Dutch theologian whose family name was Bischoep. He was born at Amsterdam, Jan. 1, 1583, and educated at Leiden, where he came under the influence of Arminius (*q.v.*). In 1612 he was appointed to a chair at Leiden University, and became recognized as the leader of the Arminians against the Calvinists. He took a prominent part in the synod of Dort in 1618, with the result that he was deprived of office and had to live for a time in France. About 1626 he returned to Holland, and became rector of the Remonstrant College at Amsterdam, where he died April 4, 1643. His *Confessio, Apologia pro Confessione* and *Institutiones Theologicae* are the standard works on Arminianism.

**Episode** (Gr. *epi*, on, in addition; *eisodios*, coming in). (1) In ancient Greek tragedy, that part of the dialogue which comes between the choric songs. (2) In music, part of a composition in which some departure is made from the main theme, or form, for the sake of variety. In the fugue form, the episodes allow the use of fragments of the subject matter, varied treatment of the subject, entries at irregular intervals of time and pitch, and free changes of key. In sonata and rondo forms, episodes are of the nature of second subjects, but of less importance than the true second subject which appears again fully in the recapitulation section. (*See* Rondo; Sonata.) (3) In literary composition, a minor event or incident introduced to give variety to a narrative, or to illustrate a character or event. A story, for instance, is said to be episodic when it consists of loosely knit incidents, or where the incidents do not merge together in a natural succession to the making of a harmonious whole.

**Epistaxis** (Gr. *epi*, on; *stazein*, to drip). Bleeding from the nose. It may arise from injury, ulceration of the mucous membrane, tumour in the nose, rupture of a varicose vein, the presence of a foreign body, or cerebral congestion. Epistaxis may also be a symptom of enteric fever, influenza, and other disorders, or may occur in chronic Bright's disease. As a rule, the haemorrhage can readily be stopped

by applying cold compresses to the root of the nose and nape of the neck. Holding the nose for a short time may allow the blood to clot and close the bleeding vessel. Frequently the bleeding point can be detected, and a touch with a cautery or with a piece of cotton wool soaked in a 5 p.c. solution of chromic acid, will usually suffice. In severe cases plugging of the nostril may be necessary.

**Epistemology** (Gr. *epistēmē*, knowledge; *logos*, theory). Theory or science of human knowledge. It investigates the origin and limits of knowledge; defines the part played in it by experience and thought respectively; and examines the formation, meaning, and employment of its fundamental notions.

**Epistle** (Gr. *epistolē*, message, letter). Term generally applied in English literature to verses written in the form of letters addressed to specific persons, or to readers generally, as in the epistle dedicatory. In the former sense it was a revival of the use of the epistle by Horace and other classical poets. Satiric or moral epistles, such as Pope's Essay on Man and Moral Essays, more or less on the Latin model, were a notable feature of English literature in the 18th century, at the close of which Burns gave the epistle an easier and freer form.

There are examples of epistles in the O.T. and in the O.T. apocryphal pseudepigraphic writings; but the famous letters or epistles of the Bible are confined to the N.T. The chief writer is the apostle Paul, to whom thirteen Epistles are ascribed. These are commonly divided into four groups (1) 1 and 2 Thessalonians, written from Corinth in A.D. 52 or 53. (2) Galatians, 1 and 2 Corinthians, and Romans, written in A.D. 57-58. (3) Ephesians, Philippians, Colossians, and the Epistles of the (first Roman) Captivity, written in A.D. 62 or 63. (4) 1 and 2 Timothy, Titus, the Pastoral Epistles, so called because they are addressed to two pastors and deal with matters relating to the ministry, written in A.D. 65. The so-called Epistle to the Hebrews does not claim to have been written by Paul, though ascribed to him in the Eastern and later in the Western Church, and the description Epistle is hardly correct. Its author is unknown. It seems to have been written between A.D. 75 and 85.

The rest of the N.T. Epistles are commonly known as General or Catholic Epistles, because they are apparently addressed to Christians in general. They are: James, Jude, 1 and 2 Peter, 1, 2 and 3 John. The author of the Epistle of

James may have been the brother of the Lord. Jude describes himself as "servant of Jesus Christ" and "brother of James." Peter is the famous apostle. The First Epistle of John is closely related to the Gospel of John. The Second and Third Epistles claim to be written by "the Elder."

**Epistolae Obscurorum Virorum** (Letters of Obscure Men). Series of satirical letters addressed to Ortinus Gratus and called into existence by the Reuchlin-Dominican controversy. They played an important part in the Reformation, and have been many times reprinted. The first part, consisting of 41 letters, was published in 1515, seven more letters being added in the 3rd edition, 1516. The second part, comprising 62 fresh letters, appeared in 1517; its 2nd edition, same year, contained eight more. The two series were not published in one volume until 1556. Their authorship, long in doubt, was established by W. Brecht, who proved the principal writers of Parts 1 and 2 respectively to have been Johann Jäger, called Crotus Rubianus, and Ulrich von Hutten. See text, ed. with Eng. trans. F. G. Stokes, 1909; consult also Die Verfasser der Epistolae obscurorum Virorum, W. Brecht, 1904. See Reuchlin, Johann.

**Epitaph** (Gr. *epi*, on; *taphos*, tomb or grave). Inscription on a tomb. The desire to record in lasting form the virtues or great deeds of the dead is universal, and has found expression in all ages. Some of the earliest extant epitaphs are found on Egyptian sarcophagi, and they were commonly used among the Jews. One of the most famous Greek epitaphs is that recorded by Herodotus as having been inscribed in honour of the Spartans who fell at Thermopylae: "Stranger, go tell the Lacedaemonians that we lie here obedient to their commands." Various anthologies and the catacombs of Rome supply numerous Greek and Latin examples.

Epitaphs vary infinitely in style, and reflect the literary taste of their age. In England they range from the lengthy recital of the deceased's titles and dignities in Latin and the solemn and elaborate survey of his career in the English of the eighteenth century to the severely simple and the frankly humorous. An effective Latin epitaph is that on Sir Christopher Wren in St. Paul's Cathedral, London, *Simon unumquemque requirit, circumspice* (If you seek his monument, look around); while humorous epitaphs of the jesting sort frequently allude to differences between husband and

wife. Much ingenuity has been devoted to the play of words in epitaphs, e.g. in S. Benet, Paul's Wharf, London, is the following:  
Here lies one More, and no more than he;  
One More and no more,—how can that be?  
Why, one More and no more may lie here alone;  
But here lies one more, and that's more than one.

Unconscious humour due to carelessness or ignorance is occasionally found, as on a tombstone at Ventnor:

Here lies the body of Samuel Young, who came here and died for the benefit of his health.

Frequently, however, epitaphs of the humorous kind are not genuine, being composed as a form of literary amusement. Some of fine quality come almost under the head of epigrams. Such are most of the epitaphs in Ben Jonson's works; for instance, the lines Underneath this sable hearse, and the beautiful tribute to Elizabeth L. H.:

Would'st thou hear what man can say  
In a little Reader, stay,  
Underneath this stone, doth lie  
As much beauty as could die;  
Which in life did harbour give  
To more virtue than doth live:  
If at all she had a fault,  
Leave it buried in this vault.  
One name was Elizabeth,  
Tho' other let it sleep with death;  
Fitter, where it died to tell,  
Than that it liv'd at all. Farewell.

**Epithalamium**. Nuptial song in praise of a newly wedded pair and invoking blessings on them, sung before the bridal chamber (Gr. *thalamos*). Fragments of Greek epithalamia by Anacreon, Pindar, and others have been preserved. One of the most celebrated by Latin poets is the epithalamium on Peleus and Thetis by Catullus. In English literature Spenser's Prothalamium and Epithalamium are among the most beautiful poems of this kind.

**Epithelioma**. Form of cancer in which the growth is mainly composed of cells pertaining to the epithelial or surface layer of the skin or mucous membrane. See Cancer.

**Epithelium** (Gr. *epi*, on; *thēlē*, nipple). Tissue composed almost entirely of cells with little cementing material. It forms the superficial layer of the skin and lines the internal cavities of the body. Pavement epithelium, consisting of one layer of cells fitted together like a mosaic, is found in the air-sacs of the lungs. Columnar epithelium lines the stomach and intestines. Stratified epithelium consisting of numerous layers of cells, covers the surface of the body. Ciliated epithelium is a form in which the surface of the cell carries a bunch of fine filaments having a continuous movement which sets up a current over the surface of the tissue. This form occurs in the air passages where the ciliary movement helps to clear the tissues of fine particles of foreign material and other debris.

**Epoch** (Gr. *epochē*, pause). In astronomy, a date arbitrarily fixed, and necessary for computing the place of a heavenly body. Jan. 1, 1901, might, for example, be the date for the definition of the positions of the planet Mercury, and all the changes in its positions would then be noted in succeeding periods of time. See Chronology.

**Epode** (Gr. *epi*, on; *ôdē*, ode). Third part of the triple system of the Greek ode, which consisted of strophē, antistrophē, and epode. The term subsequently came to be loosely used in a wider signification, being applied to certain of the lyrics of Archilochus and his imitator Horace. See Ode.

**Eponym** (Gr. *epi*, on; *onoma*, name). Name of a real or fictitious person, the reputed founder of a country or people. Such are the mythical Brutus, from whom the name Britain is supposed to be derived, and Hellen, the traditional founder of the Hellenes or Greeks.

**Eponym Canon.** Assyrian chronological table. The Sumerian identification of years by significant local events was simplified in Assyrian records by naming years after official personages in an orderly sequence. The word eponym is used after the analogy of the Greek *archon* (*q.v.*). The king was eponym in his first year, followed by his commander-in-chief, court officials, city governors, and others. Inaugurated in 1500 B.C. if not earlier, the canon hitherto recovered comprises fragmentary name-lists from Ashurbanipal's Nineveh library dated continuously from 893 to 666, and discontinuously from 911 to 640. From a supplementary list mentioning important events as well, an eclipse record was dated by astronomical calculation June 15, 763, thus fixing the whole series.

**Epping.** Market town and urban district of Essex. It stands on the summit of a hilly ridge, 382 ft. above sea level, near Epping Forest, 17 m. N.E. of London by the G.E. Rly. The church of S. John Baptist (1832) was rebuilt in 1890 and superseded All Saints at Epping Upland as the parish church in 1889. Its tower was added in 1908. The town hall was built in 1863. Epping has an agricultural trade, while cattle fairs are held here. It gives its name to a division returning one member to Parliament. Market day, Fri. Pop. 4,253.

**Epping Forest.** Stretch of wild woodland in Essex, England. All that remains of the old Royal Forest of Essex, known after the 13th century as the Forest of Waltham, it consists of about 6,800 acres between Leytonstone, S., and



Epping, Essex. The High Street, looking towards the new parish church of S. John Baptist

Epping, N., with Loughton, E., and Chingford, W., on high ground between the valleys of the Lea and Roding. The best of the wooded section includes Monkwood, N.W. of Loughton, and Epping Thicks, N.W. of Theydon Bois. Dark brown fallow deer run wild; a few small roe deer were introduced from Dorsetshire in 1883. The last of the old red deer were removed to Windsor in 1827. Rabbits are numerous, and a certain number of badgers, foxes, squirrels, and weasels are also found.

While the pollarded hornbeam is a striking feature, there are a few aged oaks, and the beech, blackthorn, crab-apple, birch, willow, holly, and brushwood, together with gorse, broom, wild rose, and honeysuckle, lend charm and variety to the landscape. Of two ancient camps, Ambresbury Banks, 2 m. N. of Loughton, is popularly assigned to Queen Boadicea; and Loughton Camp, about 11 acres, to early British or pre-Roman origin. After protracted legal proceedings Epping Forest was secured to the public by the City Corporation and the Commons Preservation Society, at a cost of £250,000, and was opened by Queen Victoria, May 6, 1882. It is controlled by a committee of the City Corporation. There is an excellent Guide by E. N. Buxton, 1911; see also *The Forest of Essex*, R. Fisher, 1887; the *Royal Forests of England*, 1905; and *Memorials of Old Essex*, 1908, J. C. Cox. See Essex; Forests.

**Éprouvette** (Fr., testing apparatus). Instrument for measuring the strength of gunpowder. The first recorded specimen is that described by William Bourne in *Inventions or Devises*, 1578. It consisted of a small metal cylinder to which was hinged a heavy metal lid, which was prevented from falling by engaging with a ratchet. The strength of the powder was measured by firing a standard weight of explosive in the cylinder with the lid closed and noting the angle to which the latter was raised.

In 1627 Curtenbach devised a small mortar, on the mouth of which rested a heavy conical shot which travelled vertically up a stretched wire passing through it. The power was measured by the height to which the charge raised this shot. In 1647 Nye, a master gunner, proposed

to measure the strength of gunpowder by noting the depth to which bullets fired from a pistol penetrated into clay. He also suggested measuring the strength of powder by the distance which a heavy spherical shot travelled when fired from a mortar. This method was taken up by the French government and the mortar was called *épreuve*. In 1742 a further advance was made, when Robins invented the ballistic pendulum, by means of which the actual velocity of a projectile could be measured. About 1820 much use was made by sportsmen of the hinged lid *épreuve* in the form of a flint lock pistol. For the testing of modern explosives much more complicated and accurate instruments have been designed to estimate the various characteristics of the explosives. See Gunpowder.

**Epsom.** Urban district and market town of Surrey, England. It is 14 m. S.W. of London on both the L.B. & S.C. and L. & S.W. Rlys. It was first known for its mineral springs accidentally discovered in 1618 by Henry Wicker when grazing his cattle. The town became a fashionable spa in the 17th century and was visited by royalty and London society, being especially popular about 1690. S. Martin's, the parish church, has works by Flaxman and Chantrey. Epsom College is a public school, especially associated with the medical profession. Near the town is Lord Rosebery's seat, The Durdans.

Epsom is known for its race meetings, held on the downs, which stretch for some miles. Here the Derby, the Oaks, and other races are run and there are several large racing stables around. The town has some industries and is an outer suburb of London. It gives its name to a division sending one member to Parliament. Pop. 19,150. See Derby; Horse-racing; Oaks.

**Epsom Salts.** Magnesium sulphate ( $MgSO_4 \cdot 7H_2O$ ). It crystallises in small rhombic prisms, and forms a useful saline purgative.



**Epstein, JACOB** (b. 1880). British sculptor. Born in New York, of Russo-Polish parents, Nov. 10,



Jacob Epstein,  
British sculptor

Berezford

1880, he studied in Paris at the École des Beaux Arts and at Julien's Academy. He has always shown originality of thought and design and remarkable technical skill. His sympathies

are both catholic and eclectic. Rodin's influence can be traced in the figures on the British Medical Association's quarters in the Strand, 1907-8, while the sculpture for Oscar Wilde's tomb, 1913, is interesting for its echoes of Abyssinian and Egyptian art. Among his most notable busts are those of Admiral Lord Fisher, the Duchess of Hamilton, Muirhead Bone, and Mrs. McEvoy, the last-named in the Johannesburg Art Gallery, and the Contemporary Art Society possesses excellent examples of his craftsmanship in a Seated Figure and the Head of Mrs. Lamb. Much discussion was aroused also by his large figures of Venus, 1917, and of Christ, 1920. See Monograph, B. van Dieren, 1920.

**Epulis** (Gr. *epoulis*, gumboil). Tumour of the jaw growing from the alveolar periosteum or fibrous membrane in contact with the bone.

**Epworth.** Market town of Lincolnshire, England. It is on the Isle of Axholme, 9 m. N.N.W. of Gainsborough and 24 m. from Lincoln. It is famed as the birthplace of John Wesley, whose father was rector here, and here the Wesleys have a church to his memory. Pop. 1,836.

**Equaliser.** In engineering, a bar which serves to equalise a pull or



Epstein. Bronze mask of the sculptor's wife, a typical example of his work

octave instead of according to nature's scale. See Harmonic Series; Temperament.

**Equation** (Lat. *aquare*, to make equal). Statement of equality between two quantities. Thus  $19 + 6 = 25$  is an arithmetical equation. In algebra an equation is usually a statement involving known and unknown quantities, the knowns being denoted by the earlier letters of the alphabet,  $a, b, c$ , and the unknowns by the later letters  $x, y, z$ .  $ax = b$  is a simple algebraic equation,  $x$  being the unknown quantity,  $a$  and  $b$  being supposed known. If  $a = 6$  and  $b = 42$  then  $x = b/a = 42/6 = 7$ .

Equations involving a number of unknowns,  $x, y, z$ , may form a system, and are then called simultaneous equations.

$$\begin{aligned} ax + by + cz &= d \\ ex + fy + gz &= h \\ kx + ly + mz &= n \end{aligned}$$

are simultaneous equations, and the problem is to find values of  $x, y$ , and  $z$  which will satisfy all three equations.

The degree of an equation is indicated by the highest power of one of its unknowns. Thus in the equation  $ax^2 + by = c$  the highest power of the unknown  $x$  is 2, and the equation is said to be of the second degree. An equation which is true for any values whatever of the quantities concerned is called an identity, and the connecting symbol is usually

three parallel straight lines:  $x^2 - y^2 \equiv (x - y)(x + y)$  is an example.

There are as many solutions to an equation as the degree of the unknown. An equation of the second

degree has two solutions, an equation of the third degree three, and so on. The methods of solving equations up to and including the fourth degree are well known, and it has been proved impossible to obtain the algebraic solutions of equations of a higher degree. The symbol  $=$  was first used by Recorde (1510-58). See Algebra; consult also W. S. Burnside and A. W. Panton, *The Theory of Equations*, 1899-1901.

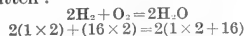
**CHEMICAL EQUATIONS.** The change which occurs in a chemical reaction is represented by formulae and symbols which show the distribution of the molecules of the reacting bodies before and after the change. The elements are represented by symbols and atomic weights, and the sum of the weights of the original substances equals the sum of the weights of the products of the reaction: hence the representation is termed an equation. Chemical equations merely express symbolically the verified results of the action of different molecules upon each other. Berthollet formulated the conditions as regards solutions as follows:

1. When two or more substances are brought together in solution, a substance will form and separate as a precipitate, if by any rearrangement of the atoms a product can be formed which is insoluble in the liquid.

2. When two substances are brought together in solution, if a gaseous body or one that is volatile at the temperature of the experiment can form, it will escape as a gas or vapour.

For example: When silver nitrate solution and hydrochloric acid are mixed, the insoluble silver chloride is formed as a white precipitate (1); when vinegar is added to a solution of washing soda (sodium carbonate) a brisk effervescence results from the carbon dioxide given off (2).

The equation representing the formation of water ( $H_2O$ ) from its elements (hydrogen and oxygen) is written:



$2(1 \times 2) + (16 \times 2) = 2(1 \times 2 + 16)$   
This equation symbolises the formation of two molecules of water from two molecules of hydrogen and one molecule of oxygen. The numbers beneath the symbols are the parts by weight of the elements involved in the reactions. The equation, however, does not tell us the conditions of the experiment; in this case a mere mixing of the gases does not result in a reaction, it is necessary to cause them to combine by means of an electric current.



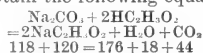
Epworth. Interior of the Wesley Memorial church built in 1889 to commemorate the birthplace of John Wesley

thrust, applied at an intermediate point equally between its two ends. See Compensating Beam.

**Equal Temperament.** System of tuning keyboard instruments with twelve equal semitones to the

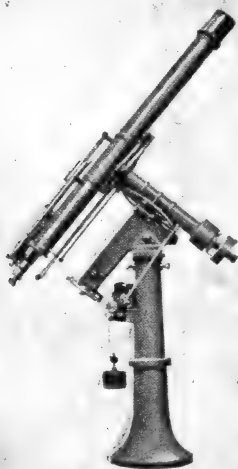


As another example, the reaction between washing soda and vinegar may be used. Washing soda is sodium carbonate ( $\text{Na}_2\text{CO}_3$ ), with ten molecules of water of crystallisation which need not be shown in the equation. The acidity of vinegar is due to the acetic acid it contains. The formula for acetic acid can be written in several ways, e.g.  $\text{HC}_2\text{H}_3\text{O}_2$ ;  $\text{C}_2\text{H}_3\text{O}_2$ ;  $\text{CH}_3\text{COOH}$ ; or  $\text{C}_2\text{H}_3\text{OH}$ . Taking the first expression as most suitable, we obtain the following equation:



On the right hand side results are shown, sodium acetate (which remains in solution), water, and carbon dioxide. We have thus accounted for the products of the reaction in accordance with the doctrine of the indestructibility of matter. The sums of the molecular weights on both sides are equal (rounded figures have been used), showing that all the atoms are accounted for.

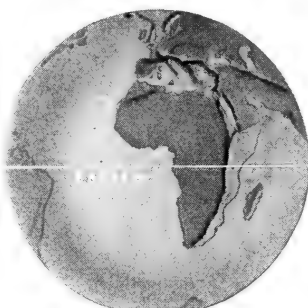
**EQUATION OF TIME.** A solar day is the interval which elapses between two successive passages of the sun over the meridian of a given place (e.g. London).



Equatorial telescope mounted to enable the observer to follow the heavenly bodies across the sky

By courtesy of T. Cooke & Son

Owing to the obliquity of the ecliptic to the equator, and to the varying velocity of the earth in its orbit, this interval is not always the same. Hence solar time differs from the mean solar time, registered by a perfectly even-going clock, constructed so as to record 24 hours to a mean solar day. There will be a difference between noon as registered by the sun and as



Equator. Perspective view of the earth, showing where the equator cuts Africa and a portion of S. America

registered by the clock, and the difference will vary from day to day. This difference is called the equation of time, and is expressed in the minutes and seconds at which apparent noon takes place before or after mean noon. See Horology.

**Equator** (Lat. *aequare*, to equalise). Circle drawn round the globe midway between the N. and S. poles. At the equator the sun is seen directly overhead at noon at the equinoxes. Latitude is measured N. and S. of this circle. It is the longest line, in one plane, that can be drawn round the earth, measuring approximately 24,902 m.

Strictly speaking, this line is the terrestrial equator. The great circle in which the plane of the terrestrial equator cuts the celestial sphere is called the celestial equator. The magnetic equator is that line drawn round the earth at any point on which the vertical components of the force of the earth's magnetism is zero. See Earth; Equinox; Latitude.

**Equatorial.** Instrument so mounted that it can follow a heavenly body from its rising to its setting. This continuous observation is regulated by clockwork machinery. In the best arrangement, a strong steel pillar supports a headpiece, in which is fixed the polar axis of the instrument, parallel to the axis of the earth. This polar axis is turned round once in twenty-four hours. A telescope fixed to such an axis will always move in a "circle of declination," and thus a clock driving the telescope in one direction as fast as the earth is carrying it in the opposite direction will always keep the telescope fixed on the same point in the sky. It is not convenient to attach the telescope directly to the polar axis, because its range is thereby limited; it is therefore fixed to a declination axis placed above the polar axis and at right angles to it. Most of the great

modern refractors are equatorials. See Observatory; Telescope.

**Equatorville.** Alternative name for the administrative and trading centre of the Belgian Congo, better known as Coquilhatville (*q.v.*).

**Equerry.** Originally an official of the royal stables. In the British royal household the equeries are army officers in the department of the master of the horse. The chief or crown equerry is a permanent official, who looks after the stables and stud. The sovereign always has an equerry in attendance. The form of the word, originally meaning stable (Fr. *écurie*, late Lat. *scuria*), has been influenced in English by a supposed connexion with Lat. *equus* (horse).

**Equidae** (Lat. *equus*, horse). Family of Ungulate mammals, including the horses, asses and zebras. In geological history, the horse family can be traced back to ancestors that had five toes instead of the single toe of modern horses. The Phenacodus, a five-toed animal about the size of a bull-dog, lived at the beginning of the tertiary period. The next stage is seen in Hyracotherium, with four equal toes on the fore limbs, found in lower eocene strata. Succeeding stages are represented by Anchitherium, with three toes and a diminutive fourth, in the Miocene age in Europe; Hipparion, with one large middle toe and two smaller side toes, in the Pliocene age; and Equus, two diminutive toes on each side of the large toe, in the Pliocene age. See Horse.

**Equilibrium** (Lat. *aequus*, equal; *libra*, balance). In a system of forces a state of equilibrium exists when the forces under consideration are so arranged that they balance or have no resultant at any point. A body is in stable equilibrium when it returns to its original position after being disturbed; in unstable equilibrium, when it continues to move in the direction given to it by a disturbing force.

**CHEMICAL EQUILIBRIUM.** A balanced action between chemicals similar to that indicated by equilibrium in mechanics. It most closely resembles the mechanical equilibrium established when friction is large or inertia small, because in a chemical system there is nothing corresponding to the oscillations in mechanics. See Dynamics; Motion.

**Equinoctial Gales** (Lat. *aequus*, equal; *nox*, night). Term indicating a belief that gales normally occur about the equinoxes. In N. America and Europe and over the N. Atlantic Ocean, from Nov. to Jan. is the period of most frequent and most intense gales. See Meteorology; Weather.

**Equinox.** Dates on which the day and night are of equal length, and the length of day is the same for all parts of the world. Twice a year—at the vernal equinox, March 22, and at the autumnal equinox, Sept. 22—all places on the earth experience a day and a night each twelve hours long.

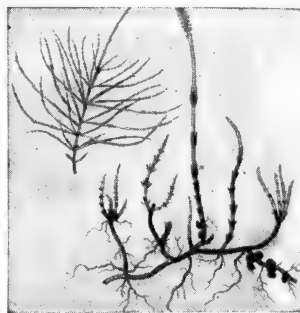
The plane of the path of the centre of the earth round the centre of the sun is called the plane of the ecliptic. The earth is tilted, and the axis of its rotation makes a constant angle with this plane. Consequently the plane of the earth's equator infinitely produced cuts the celestial sphere in a fixed great circle which is called the celestial equator. At the points where the plane of the ecliptic cuts the plane of the equator, or more precisely, when the earth in its annual path is at these points, it will be so placed with regard to the sun that all over the earth day and night will be equal in length.

**Equipment.** Term employed popularly to describe the complete outfit worn and carried by the soldier in the field, but officially restricted to weapons and accessories as distinct from clothing and necessities. The equipment of the British infantryman comprises ammunition (150 rounds .303 inch for rifle), bayonet with scabbard and frog, belt with braces and cartridge carriers, haversack with rations, knife, fork, and spoon, entrenching implement and carrier, mess tin, pack containing greatcoat, mending and cleaning materials, toilet necessities such as razor, towel, and brushes, rifle, and water-bottle.

Cavalry carry similar equipment, but with leather belt and bandolier in place of the webbing belt, braces and cartridge carriers, and in addition a sword and scabbard (also in some cases a lance), and various articles of saddlery and harness. They do not carry a pack, the small articles which the infantryman places therein being accommodated in the haversack. The normal weight of the infantry equipment is about 60 lb., and a cavalry horse carries about 270 lb. including the rider. The present webbing belt and braces issued to the infantry weigh much less than the old leather gear, permit of exact adjustment to the most comfortable position for the individual wearer, and are so designed that no straps cross the chest or back, thus permitting of unrestricted breathing in spite of the heavy load. The cartridge carriers are arranged on the front of the braces which support the belt, their weight being balanced by that of the pack secured to the braces on

the shoulders, the remaining items being slung on the belt so that the shoulders bear all the weight.

**Equisetaceae** (Lat. *equus*, horse; *seta*, bristle). Small natural order of Pteridophytes. It consists of the single genus *Equisetum*—the horsetails. They are mostly natives of the N. temperate regions, but a few are sub-tropical. They have creeping rootstocks from which arise the erect, hollow, jointed stems, which are round, and finely grooved. They are solid at the joints, which have toothed sheaths into which the next joint fits and from which the branches are given off in whorls. The spores are produced on the undersides of scales of a terminal oval cone. *E. martii*, a native of Brazil, attains a height



*Equisetaceae.* Fertile and barren stems of the horsetail

of 30 ft., but the other species are only a few feet high. The stems are covered with silica, and those of *E. hyemale* constitute the Dutch rushes of commerce, used for scouring and polishing.

**Equitable.** British life assurance company, in full the Equitable Life Assurance Society. Founded in 1762 as the Society for Equitable Assurance in Life and Survivorship, it is one of the oldest of the kind. In 1892 it was registered as a company. It is what is known as a mutual office, i.e. it has no shareholders merely as such. It has a controlling interest in the University Life Assurance Society and the Reversionary Interest Co. The head offices are 110, Mansion House Street, London, E.C.

**Equitable Charge.** In English law, a charge on property which formerly was not enforced by a court of common law, but only by the court of chancery. Wherever the chancery court found an intention in a document that a sum of money should be secured on property, or paid out of it, the court would enforce it as a charge. For instance, if A owes B money, and gives B a letter saying "I will pay you out of the money due

to me by C," this is a charge on C's debt, and the court will restrain C from paying the debt to A without satisfying B's claim. To-day all courts recognize and enforce equitable charges.

**Equitable Estate.** In English law the legal ownership of property may be vested in one person, and the equitable ownership in another. Thus a trustee is the legal owner of the trust property, but the beneficiaries have the equitable estate.

**Equites** (pl. of *equus*, horseman). In ancient Rome, originally citizens wealthy enough to support the burden of serving as horse soldiers. With lapse of time, as the citizen militia gave way to a paid army, the *equites*, conventionally translated knights, became merely a class in the state possessed of a certain amount of wealth, ranking below the senatorial order, but above the common people. As senators were forbidden to engage in trade, this equestrian order tended to be composed largely of merchants and other capitalists.

The farming of taxes was an equestrian privilege, and at one time jurymen were exclusively drawn from the ranks of the knights. Under Augustus the order became more sharply defined; certain posts in the state service were reserved for them, the most important being the governorship of Egypt, the commissionership of corn supply, and the command of the fleet. The originally military associations of the *equites* survived only in state ceremonies. *Pron.* ek-wit-eez.

**Equity** (Lat. *aequitas*). Term used by English lawyers to describe that part of the law of England formerly enforced only by the court of chancery, and not by the common law courts. Equity was of two kinds: (1) where the court of chancery gave rights which the common law courts did not give; and (2) where chancery gave remedies which the common law knew nothing about.

Equitable rights unknown to the common law were numerous. The common law knew nothing of trusts and trustees. If a man had property conveyed to him, he was the legal owner, but if the property had been conveyed to him to be applied for the benefit of another, the chancellor would enforce the trust. The chancellor's jurisdiction was said to be founded on conscience. Gradually, side by side with the common law and sometimes conflicting with it, a great system of equity or chancery law grew up. When rights at common law and rights in equity did so conflict, the chancery court would grant an injunction to restrain the defendant

from exercising his legal rights—that is, from bringing or going on with a common law action to enforce those rights. Since the Judicature Act, 1873, all courts administer common law and equity side by side, so that such injunctions are now unnecessary.

Equitable remedies unknown to the common law were invented by the chancellors. The chief were the injunction and specific performance. The latter compels a man to carry out the contract he has made, and does not allow him to break it and pay damages. This jurisdiction was founded on the inadequacy of the remedy at common law, whose one and only panacea for every wrong and every breach of contract was damages. On the same principle the chancellor would grant an injunction to restrain a breach of contract, or the continuance of a wrong, or the commission of a threatened wrong, where damages would be an inadequate remedy. Thus, if I had a right of way over a footpath across A's field, and A stopped up the path, at common law I would get damages; but in equity I would have an injunction to restrain A from continuing to obstruct the path; and if A disobeyed, he would be attached. Equity, however, would not grant specific performance of every contract, or grant an injunction to prevent every wrong; but only when the remedy in damages was inadequate.

At common law there was no discovery, and, until comparatively recently, neither plaintiff nor defendant, nor anyone privy to them in blood or estate, was allowed to give evidence. This did not apply in the chancery court. So a common law plaintiff or defendant used to "file a bill" for discovery. That is, he made the other side answer on oath as to what documents he had in his possession. Also he could ask a long string of questions about the common law action, and compel the other side to answer them in writing and on oath. This procedure is now obsolete, as all courts, even county courts, have power to order discovery and interrogatories.

The principal subjects of the equitable jurisdiction are the enforcement and administration of trusts; the winding-up of partnerships; the administration of deceased persons' estates; the guardianship and property of infants; injunctions; the specific performance of contracts; the taking of accounts; the rectifica-

tion, setting aside, or cancellation of deeds or other written instruments, on the ground of mistake, misrepresentation, fraud, or undue influence; and the partition or sale of real estates.

At one time a court of equity could not award damages. They were reserved for the courts of common law. By the Judicature Act, 1873, however, all branches of the high court can now award damages in proper cases; though it is still unusual to bring an action for damages alone in the chancery division. See Jurisprudence; Law.

R. Storry Deans

### Equuleus (Lat., young horse).

One of the Ptolemaic constellations. It is a small group of stars close by the head of Pegasus, so placed as to suggest that another horse is galloping by Pegasus.

**ERA** or **AERA**. In chronology, a fixed point of time from which years and historical events are reckoned. Generally the date of some decisive occurrence in the history of the world, or of a particular people or individual, it also denotes the series of years reckoned therefrom. Important eras are: the Greek Olympiads, from 776 B.C.; the Roman, from 753 B.C., the traditional date of the foundation of Rome; the Babylonian, that of Nabonassar, 747 B.C.; the Spanish from 38 B.C., the conquest of Spain by Augustus; the Christian; the Mahomedan, 622. See Chronology.

**ERA, THE**. Weekly organ of the theatrical and musical professions. It was founded, Sept. 30, 1838, and acquired by Frederick Ledger in 1856, being afterwards edited by his son Edward. It was bought by Sir William Bass in 1904; and in 1916 was owned by Messrs. Bert Feldman and Alfred Barnard, the editor. The Era Almanack was first issued in 1868.

**ERADICATED** (Lat. *ex*, out; *radix*, root). In heraldry, a term applied to a tree shown torn up by the roots.

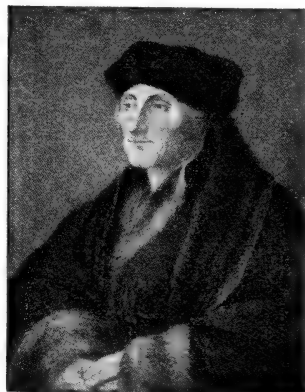


Erased in heraldry

**ERASED**. In heraldry, a charge, such as a head, a limb, a branch of a tree, shown with a jagged end. But a branch shown as torn off is generally said to be slipped if small, or snagged if large.

**ERASMUS, DESIDERIUS** (1466-1536). Dutch humanist. He was probably born at Rotterdam, Oct. 28, 1466, the illegitimate son of Gerard de Praet of Gouda. For the name Gerard, meaning well-beloved, he afterwards substituted

the incorrect Latin and Greek equivalents, Desiderius Erasmus. After four years' schooling at Deventer, he was sent by his guardians to a seminary of the Brothers of the Common Life at Hertogenbosch (Bois-le-duc), and in 1486



*Erasmus*

After F. Penn in the Royal Collection at Windsor

entered the cloister of Stein and took the vows of the Augustinian order. In 1491 he became secretary to the bishop of Cambrai and a priest in 1492. After spending some time at the Collège Montaigu in Paris, he returned to Cambrai, but resumed his studies in Paris in 1496. At the same time he took pupils, one of whom, Lord Mountjoy, invited him to England.

Residing chiefly at Oxford, he became the friend of Thomas More and Colet, and received instruction in Greek from Grocyn and Linacre. He re-visited England in 1506 and 1509, the last time at the invitation of Fisher, bishop of Rochester and chancellor of Cambridge university. He taught Greek in Cambridge, and was appointed Lady Margaret professor of divinity. Between his visits to England and for some time afterwards he led a wandering life. From 1521-29 he was at Basel, where most of his works were published, and at Freiburg from 1529-35, whence he returned to Basel and died July 12, 1536.

Of his editions of classical works the most important is Terence, 1532. Adagia, 1500, and Apophthegmata, 1531, contain maxims and anecdotes from classical authors, accompanied by moral reflections; Ciceronianus, 1528, is an attack upon the Italian school of Latin prose writers, who refused to admit any words or phrases not found in Cicero. He edited many of the Fathers of the Church, but his greatest service to

theology was his edition of the New Testament, 1516, the Greek text with a Latin translation, his treatment of which entitles him to be called the pioneer of Biblical criticism. The *Enchiridion Militis Christiani* (Dagger or Manual of the Christian soldier), 1502, is an attack on the inefficacy of formal religion. Other famous treatises are *Encomium Moriae* (Praise of Folly), 1509, a satire on clerical abuses and human follies, and *Colloquia*, 1516, specially a castigation of the vices of priests and others. Much of his correspondence throws light on the manners and customs of the England of his day.

Erasmus has been much criticised for the part he played in the Reformation and his attitude towards Luther. "Erasmus laid the egg and Luther hatched it," it was said. The truth is that Erasmus was a scholar, not a theologian; he was not the stuff of which religious zealots or martyrs are made. To use his own words, "I am afraid if I were put to the trial, I should imitate S. Peter." While conscious of the faults of Roman Catholicism, he always remained a Catholic, and while acknowledging the need of religious reform, he clearly saw the dangers that would inevitably follow extremist efforts in that direction. See *Humanists*; *Renaissance*.

J. H. FREESE

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**Erastianism.** Term specially applied to the view of Church policy which regarded the Church as mainly or solely a department of the state. Its upholders urged that while the choice and practice of religion was a matter for the individual conscience, the external organization of churches—including the appointment of ministers—was a function of the State. In a general sense, Erastianism means the doctrines of Thomas Erastus.

**Erastus, THOMAS** (1524-83). Swiss theologian. His family name was Lieber or Liebler, of which Erastus (beloved) is the Greek form. Born at Baden, Switzerland, of peasant origin, he studied theology at Basel, and medicine and philosophy at Padua. In 1558 he became professor of medicine at Heidelberg, and later of ethics at Basel. A strong opponent of Calvinism, he upheld the Zwinglian doctrine. In an important post-

humous work, he maintained that the offences of Christians should be punished rather by the civil power than the ecclesiastical (see *The Theses of Erastus touching Excommunication*, Eng. trans. R. Lee, 1844).

**Erasure** (Lat. *e*, out; *radere*, to scratch). Word meaning to obliterate, used mainly in connexion with written documents. In a legal document an erasure may be fatal to its validity, unless it can be proved that it was made before the document was executed. The parties concerned should initial the place where the erasure is made.

**Eratosthenes** (c. 284-204 B.C.). Greek geographer, mathematician, astronomer, critic, and poet. Born at Cyrenê, he studied at Alexandria and then at Athens, whence he was summoned in 235 by Ptolemy Euergetês to take charge of the library at Alexandria, a post which he held until his death. His chief work, *Geographica*, was a treatise on physical, mathematical (based on his method of measuring the earth), and political geography. His mathematical works included a treatise *On Means*; the *Koskinon* (sieve) was a mechanical device for finding prime numbers. He also wrote an astronomical poem, *Hermes*, a description of the heavens and the mythological legends associated with the stars; a *Chronographia* or *Annals*; a valuable list of the victors in the Olympic games; and a history of old comedy.

**Erbium.** Metallic element of the rare earth erbia, which is its oxide. Its atomic weight has been determined as 167.7, and its specific gravity as 4.77; but while pure compounds have been prepared, the element has not yet been isolated. The oxide was first recognized in 1843. With dysprosium, holmium, and thulium it forms the erbia sub-group of rare earths, all of which are included in the yttrium group. Erbia is found in almost all the rare earths, but is most conveniently extracted from zenotite, fergusonite, euxenite, polychrase, and blomstrandin.

**Ercilla y Zuñiga, ALONSO DE** (1533-95). Spanish poet. He was a native of Madrid, and became attendant to Philip II, whom he accompanied to England in 1554. Ercilla fought in Chile against the Araucanians. The closing years of his life were lived in poverty and

neglect. His poems are mainly heroic, notably *La Araucana*, which embodied his war experiences.

**Eckmann-Chatrian.** Compound signature of two successful literary partners and collaborators. They were Emile Eckmann, born

May 20, 1822, at Phalsbourg, and Alexandre Chatrian, born Dec. 18, 1826, at Soldaten-thal, both in Lorraine. They began to collaborate in 1848, but first won success

in 1859 with *L'illustre Docteur Mathéus*. In 1862 they began, with *L'invasion: ou le fou Yégo*, a series of novels which included *Histoire d'un Conscrit* and *Waterloo*, which remain among the best war stories ever written. Industrious playwrights, also in collaboration, they wrote *Le Juif Polonais* (*Théâtre Cluny*, June, 1869), familiar in English



Emile Eckmann,  
French author

to all playgoers as *The Bells*. Another of their plays, *L'ami Fritz*, 1876, retains its popularity in various modified forms. The collaboration was terminated by a difference of opinion on money matters. Chatrian died in Paris, Sept. 4, 1890. Eckmann died at Lunéville, March 13, 1899.

**Ercole da Ferrara** (c. 1462-1531). Italian painter. Born at Ferrara, little is known of him

except that he was in the service of the Duke of Ferrara from 1492-99, and died in Ferrara in 1531. Among his best works, distinguished by the warmth of their coloring, are *The Madonna and Child*, and *Conversion of S. Paul* in the National Gallery, London. His real name appears to have been Ercole di Giulio Grandi, and his pictures have often been confounded with those of his fellow-townsmen and contemporary, Ercole di Roberti Grandi (c. 1455-96), probably his brother. The latter



Ercole da Ferrara,  
Italian painter

From an old engraving



Alonso de Ercilla  
y Zuñiga,  
Spanish poet

was obviously influenced by Mantegna in his earlier work at Bologna; his second style, adopted after he settled in Ferrara in 1486, was more suave and graceful.

**Erdelli**, DIMITRI. Russian soldier. A corps commander early in the Great War, in 1917 he commanded the 11th army. The troops, however, were infected with insubordination following the revolution, and on his sector occurred the first great breach leading to the Russian retreat, although he made strong efforts to restore discipline. Appointed military governor of Petrograd by Kerensky July, 1917, he was arrested with Denikin, Sept., 1917, but was released. Later, he was reported to have been shot.

**Erdington**. Suburb and ecclesiastical district of Birmingham. It lies N. of the city proper, of which it is a residential suburb. It is now part of the municipality, and has a station on the L. & N.W. Rly. Pop. 28,940. See Birmingham.

**Erebus** (Gr. *erebos*, darkness). In Greek mythology, son of Chaos and father of Hemera (Day) by union with his sister Nyx (Night). The word is sometimes used as equivalent to the lower world generally, sometimes for the region through which souls passed on their way to Hades proper.

**Erebus**. Volcano of Ross Island, off S. Victoria Land, Antarctica, in lat. 77° 30' S. It has an alt. of 12,370 ft. Another volcanic peak, Mt. Terror (alt. 10,900 ft.), lies 30 m. farther E. They were discovered by Captain James Ross in 1841, who named them after his

Warka on the left Euphrates bank between Samawa and Shatra. 138 m. S.S.E. of Bagdad, and its extensive ruins attest its former greatness. Mentioned in Gen. 10, the hegemony established by Lugalzaggisi (c. 2825 B.C.) was finally secured by Ur about 2450. Ashurbanipal deported to Samaria some of its inhabitants, the Archævites of Ezra 4. Loftus's excavations, 1854, revealed the temple and ziggurat (or tower) of its city-goddess Nana. Further excavations in 1913 brought to light relics of the Arsacid and Seleucid period.

**Erechthæum** (Gr. *Erechtheion*). Ionic temple on the Acropolis, Athens (*q.v.*), just N.W. of the Parthenon. It was built partly in honour of the Greek hero, Erechtheus, and contained the shrine and a sacred wooden image of Athena Polias, guardian of the city, and the tomb of Cecrops, beside other treasures. A unique and beautiful structure, much of which is still standing, it is noted for its remarkable porch of the Caryatides (*q.v.*), six draped female figures supporting the roof. The original building was destroyed by the Persians in 480 B.C.; the new, begun about 437 or later, was much damaged by fire in 406, and was unfinished in 395. See Athens.

**Erechtheus** OR ERICHTHONIUS. In Greek mythology, legendary king of Athens. He was said to have been the founder of the great Athenian festival of the Panathenaea, and to have introduced the worship of Athena.

**Eregli**. Name of three towns, two in Asia Minor and one in

Thrace. (1) A port of Asia Minor on the Black Sea, between the Bosphorus and Sinope. This was the ancient Heraclæa, whence Xenophon's 10,000 Greeks set out on their return to Greece by sea. Sometimes called Banderegli, it is a busy place, with some shipbuilding and an export trade in silks, cattle, and coal. Pop. 5,000. (2) Town of

Asia Minor the ancient Cybistra. It stands on the Bagdad Rly., halfway between Konieh and Adana. There are remarkable Hittite remains in the neighbourhood. Pop. 10,000. (3) Town of Thrace. It stands on the European side of the Sea of Marmora, about 50 m. W.S.W.

of Constantinople. It is also known as Eski Eregli and was the ancient Perinthus. Pop. 3,000.

**Eremurus**. Genus of perennial herbs of the natural order Liliaceae. Natives of Asia, from S. Russia to Hindustan, they have fasciated roots, long slender leaves, and leafless flower stems terminating in a long spray of yellow, rosy, or white flowers, much like those of the hyacinth.

**Eretria**. Ancient city of Greece, on the W. coast of Euboea. It stood on the Euripus, 14 m. S.E. of Chalcis. It sided with the Greeks of Asia Minor against the Persians in 498 B.C., who destroyed it eight years later. Rebuilt by the Athenians, it was the seat of a short-lived school of philosophy founded by Menedemus, whose tenets were akin to those of the Megarians. Eretria figured prominently in the war between Athens and Philip of Macedon. Recent excavations have revealed the remains of a theatre, an early temple, and other relics of the pre-Persian period. The site is now occupied by the unhealthy and swamp-bound town of Nea Prasá.

**Erfurt**. City of Germany, in Prussian Saxony. It stands on the Gera, 14 m. from Weimar. The finest building is the cathedral, dedicated to the Virgin Mary, which was mainly built in the 13th century and restored in the 19th. Among its features are the beautiful chancel, the cloisters, and the lofty towers. It has decorations by Peter Vischer and others. Next to it, on the Friedrich Wilhelm Platz, is the church of S. Severus.

There are other old churches, including the Prediger, the merchants', and the Barfüsser. All date from the 12th and 13th centuries, when Erfurt was a great monastic centre. Two of its convents still remain, but the monastery to which Luther belonged is now an orphanage, being called in his honour the Martinshof. Other buildings are the town hall, a picture gallery, a library and museums. Two citadels overlook the city, which was fortified until 1873.

Apart from its historical interest, Erfurt is a busy industrial town, having become so in the 19th century. Rly. stock and various kinds of clothing are manufactured, also chemicals, machinery, furniture, etc. Brewing and dyeing are other industries. In and around much land is devoted to growing flowers and vegetables, for which the city is one of the chief markets in Germany. There are theatres, baths, and a service of electric tramways. In the suburb of Ilversgehofen is a noted salt mine.



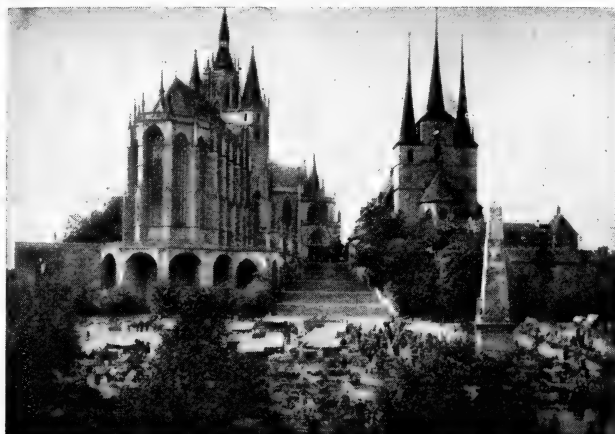
Erebus. Sir Ernest Shackleton's camp 7,000 ft. up Mt. Erebus. The steam from the active crater is visible on the mountain top

By courtesy of Wm. Heinemann

ships. Erebus has been recently active, but Terror is dormant or extinct. The former was reached in March, 1908, by the expedition under Shackleton.

**Erech**. Biblical name of the Sumerian city Uruk. Its site is occupied by the modern village of





Erfurt. The Gothic cathedral church of Our Lady seen from the east. Below it is the Friedrich Wilhelms Platz and to the right the 15th century church of S. Severus

Erfurt was a town in the 8th century or earlier, being then made a bishopric. The archbishop of Mainz took possession of it, maintaining it with difficulty. For a time it was part of Thuringia, but in 1255 it became a free city, as such joining the Hanseatic League, this being the time when its wealth and prosperity were most marked. The electors of Saxony secured it, but in 1648 it was again given to the elector of Mainz, who held it until 1802, when it became Prussian. From 1806 to 1814 the city was in the power of Napoleon. In 1850 the states of N. Germany held a parliament here. From 1378 to 1816 Erfurt had a university. Pop. 123,548.

**Erg** (Gr. *ergon*, work). Measurement of work done by the force of one dyne acting on a body through a distance of one centimetre. The unit of power is the erg per second. See Dyne.

**Ergasteria** (Gr., workshops). Port of Greece, better known as Laurium (q.v.).

**Ergeri**. Alternative name of the Albanian town of Argyrokastro (q.v.).

**Ergot** (Fr., spur). Fungoid pest (*Claviceps purpurea*) that attacks the flowers of cereals—especially rye—cultivated grasses, such as rye-grass and Timothy grass, and wild grasses. What should have been a grain is replaced by a hard spur-like outgrowth (ergot), which, if devoured by pregnant stock, may cause abortion. Ergots should not be sown with grain or grass seeds, and wild grasses infested by them should be destroyed.

The chief active principle of ergot is ergotoxin, a substance which causes powerful contractions of the uterus. For this reason ergot

or its preparations are sometimes administered after labour to ensure efficient contraction of the uterus and diminish the risk of post-partum haemorrhage. This property of ergot formerly led to its use to induce labour where this was desirable on medical grounds, but its action in this respect is very uncertain, and the drug is now hardly ever used for this purpose. It is sometimes resorted to with criminal intent, but it may cause severe symptoms of general poisoning without achieving the desired result.

Poisoning by ergot may be acute or chronic. Acute poisoning, which may result from taking a single large dose, gives rise to giddiness, vomiting, colicky pains in the abdomen, disturbance of vision, cramps, muscular weakness, coma or delirium, and convulsions. Fatal cases are rare, but if the poisoning is associated with premature expulsion of the uterine contents the risk is much greater. Chronic poisoning is generally the result of eating, for a considerable period, bread which has been made from rye or other cereals infected with the fungus. Ergotism, as the condition is called, is not often seen in this country, but it is common in certain parts of the Continent, particularly Russia. The early symptoms are those of irritant poisoning: vomiting, diarrhoea, and pain in the abdomen. The latter symptoms present two types, the nervous and the gangrenous form. In the former there may be tingling sensations in the skin, spasms, and painful cramps in the muscles. Generalised convulsions resembling those of epilepsy may occur. Paralysis and affections of the mind, such as delirium, melancholia, or dementia, are other manifestations. The gan-

grenous form may lead to mortification of the fingers and toes. Both sets of symptoms may be present in one individual.

**Eric**. Masculine Christian name. A Scandinavian word meaning ever king, it has been especially popular in the Scandinavian countries. It was brought from there into England. There is a feminine form, *Erica*.

**Eric XIV** (1533-77). King of Sweden, 1560-68. Born Dec. 13, 1533, he was the son and unworthy successor of Gustavus Vasa. His short reign was marked by the limiting of the power of the royal dukes and by the securing of Esthonia, which began Sweden's policy of oversea expansion. His insanity and cruelty cut short his reign, for after the murder of the Stores in 1567 the nobles rose and deposed him (1568). At different times he contemplated marriage with Elizabeth of England, Mary of Scotland, Christina of Hesse, and Renée of Lorraine, but finally contented himself with marrying his mistress, Katrina Månsdotter, a peasant. He is believed to have been poisoned Feb. 26, 1577, by his brother and successor, John, to put an end to conspiracies in his favour.



Eric XIV.  
King of Sweden

**Ericaceae** (Gr. *erikē*, heath). Large natural order of evergreen shrubs, under-shrubs, and a few small trees. They are chiefly natives of temperate and cold climates.



Ericaceae. Leaves and flowers of  
*Calluna vulgaris*

They have simple leaves, and regular flowers, some, e.g. the heaths (*Erica*), bell-shaped or tubular, others expanded, e.g. the rhododendron.

**Ericht**. Loch on the borders of Perthshire and Inverness-shire, Scotland. Lying 1,152 ft. above sea level, it is 14½ m. long and has a greatest depth of 513 ft. Overlooking the W. shore is Ben Alder

(3,757 ft.) Here is a cavern in which Charles Edward sought refuge after the battle of Culloden.

**Ericsson, John** (1803-89). Swedish-American engineer. Born July 31, 1803, in Vermland, Sweden,



**John Ericsson,  
Engineer**

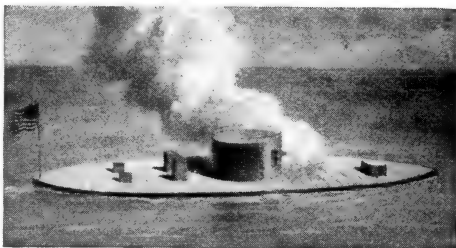
at an early age he developed great aptitude for mechanics, and in 1820 became an engineer in the Swedish army. Seeking a wider scope for his talents, he came to England in 1826 and occupied himself with improvements in steam machinery. Three years later he built, with John Braithwaite (*q.v.*), the Novelty locomotive engine to compete with Stephenson's Rocket. Ericsson was occupied with various inventions, chiefly marine engines, up to 1836, when he brought out a marine screw propeller.

Not obtaining the recognition he expected from the British Admiralty, in 1839 he went to America, where he lived for the remainder of his life. Turning his attention to defensive armour for warships and improvements in marine engines, he gained a wide reputation. In 1861 he designed the famous armoured turret ship the Monitor, and in 1862 built a number of similar vessels for the American navy. Ericsson's contributions to the science of mechanical engineering had a marked effect on the navigation of the world. He died in New York, March 8, 1889. *See* Life, W. C. Church, new ed. 1892.

**Eridanus.** In classical mythology, a river and river-god of Italy. It was identified with the Padus, the modern Po, which rises in the Alps and discharges into the Adriatic by several mouths.

**Eridanus.** One of the Ptolemaic constellations. The larger part of it is below the northern horizon. Alpha Eridani or Achernahr is known as the End of the River; but the title was given by Ptolemy to Theta Eridani much farther N. Beta Eridani is known as Cursa, the footstool of Orion. The constellation is also called the River, which may have referred to the Euphrates. *See* Cursa.

**Eridge Castle.** Seat of the marquess of Abergavenny in Sussex, near the Kentish border, 3 m. from Tunbridge Wells. The estate has belonged to the Nevilles since the 13th century, but the present castle is modern, being built early in the 19th century. The park covers 2,000 acres. At Eridge Green are the



**Ericsson. The Monitor, an ironclad turret ship, built from Ericsson's plans by the Federal Navy during the American Civil War**

Eridge Rocks. The village has a station on the L.B. & S.C. Rly., and the place gives its name to the Eridge Hunt. It is probable that there was a deer park here in 1086.

**Eridu.** Sumerian settlement at Abu Shahrain, S. of Muqayyar (Moghair or Ur), S. Babylonia. Originally an islet on a Persian Gulf estuary, sacred to the water-god Ea, it was the traditional cradleland of some aspects of Babylonian religion. Examined by J. E. Taylor, 1854, its sandstone wall, 20 ft. high, enclosed a platform with marble staircase, bearing a two-staged brick tower. Capt. R. C. Thompson's excavations in 1918 revealed a pre-Sumerian neolithic substratum, and copper-age culture, further explored by H. R. Hall during 1919.

**Erie.** Southernmost of the chain of great lakes of N. America. It forms part of the boundary between the U.S.A. and Canada. Area, 10,000 sq. m. It is 250 m. long, and its greatest breadth is 60 m., while its average depth is 90 ft. The lake is 565 ft. above the level of tide water in the Hudson river at Albany, and 330 ft. above the level of Lake Ontario, into which it discharges its waters by the Falls of Niagara. At its N.W.

end it receives the surplus waters of lakes Superior, Michigan, and Huron, through the river Detroit. Contributory feeders are the rivers Thames and Grand. A large number of steamers and other ships traverse it, except in winter, when it is

generally frozen over for a considerable period. In very hard winters it is possible to cross from the U.S.A. to Canada over the ice.

Lake Erie is the outlet of a large system of connecting canals, which render its navigation of great importance. The Welland Canal connects with Lake Ontario; the Erie Canal affords communication between Buffalo and Albany, thus linking up with the Hudson river; the Ohio Canal begins at Cleveland and ends at Portsmouth, on the Ohio river; and the Miami and Erie Canal connects Toledo with Cincinnati. During the war of 1812-15 an American squadron, under Commodore Perry, captured here a British force of six vessels on Sept. 10, 1813.

**Erie.** City of Pennsylvania, U.S.A., the co. seat of Erie co. On Lake Erie, 88 m. S.W. of Buffalo, it is served by the New York, Chicago and St. Louis, and other rlys. Its fine natural harbour, with artificial improvements, is protected by Presque Isle, a strip of land 6 m. long and 1 m. in extreme breadth, and has a maximum depth of 25 ft. An important industrial and commercial centre with a valuable



**Erie. Engineering works on the shores of the lake at Buffalo, N.Y.**

*By courtesy of Grand Trunk Railway of Canada*

trade by lake and rly. in coal, iron, grain, and agricultural produce, Erie has ironworks, machinery, paper, woollen, silk, motor-car, and tobacco factories, foundries, and chemical works. Its chief buildings include the court house, city hall, two cathedrals, and a public library, and it has several educational establishments and benevolent institutions. Founded on the site of the old French fort of Presque Isle,



**Erinus.** Roots, foliage, and flower of *Erinus alpinus*

erected 1753, Erie's city charter dates from 1851. In Aug., 1915, the city was inundated by a cloudburst, when many people perished and considerable damage was done to property. Pop. 76,590.

**Erie Canal.** Largest artificial waterway in the U.S.A. Extending across New York State from Buffalo to Albany, it communicates between the Hudson river and Lake Erie. Begun in 1816, and completed in 1825, it has a length of 361 m. Originally only accessible to boats of 70 tons, periodical alterations increased its breadth to 70 ft. and its depth to 9½ ft., making it navigable for vessels of 250 tons. Vessels of 1,000 tons can make its passage. For five months in the year navigation is obstructed by ice. It serves Rochester, Syracuse, Utica, and Troy.

**Erigena, JOHANNES SCOTUS** (c. 810-877). Scottish philosopher and theologian. He was a Scot born in Ireland, which at the time was called Greater Scotland, the name *Erigena* (*Ierugena*, *Erugena*, *Eriugena*) probably meaning Irish-born. About 840 he was summoned by Charles the Bald to Paris, where he became teacher at the court school. *Erigena* attempts to combine the neo-Platonist theory of emanation with the Christian idea of the Creation and the doctrine of the Trinity, the result being a kind of pantheism, the view that all things are contained in God. ○

**Erin.** Poetical name for Ireland. It was popularised by Thomas Moore's *Irish Melodies*, but is of

much earlier origin. Philologists assume an old Celtic form, *Iveriu* or *piveriu*, probably meaning fertile (cf. Gr. *pi-ōn*, fat), in old Irish *Eriu*, in the declension of which *Erin*, *Erinn*, appear. The Greek name *Iernē* = *Ivernē*, the *v* being preserved in the Latin *Juvena* or *Juberna*, of which *Hibernia* (*q.v.*) is another form.

**Erin go bragh.** Irish phrase meaning Ireland for Ever. Through its association with Ireland's demand for a freer and more independent government it became a party instead of an entirely national cry. It is widely used as an expression of national sentiment, equivalent to Scotland for Ever.

**Erinus.** Genus of alpine herbs of the natural order Scrophulariaceae. They are natives of W. Europe. The spoon-shaped leaves, which grow in a tuft, have their broad ends boldly cut into about five pointed teeth. The leafy stem ends in a cluster of pretty rosy-purple or yellow flowers.

**Eryines.** In Greek mythology, older name of the Eumenides (*q.v.*), or tragic furies.

**Eriocaulaceae** (Gr. *erion*, wool; *kaulos*, stalk). Natural order of rush-like perennial marsh herbs. Chiefly natives of the tropics, they have slender, spongy leaves, and minute flowers gathered into a head. These flowers are either male or female, the former having two or three stamens and a rudimentary ovary, the latter with developed ovary and short style, but no stamens. Pipe-wort (*Eriocaulon septangulare*) of European lakes is typical of the order.

**Eriphylē.** In Greek legend, sister of Adrastus, king of Argos,



**Erith.** The parish church of S. John the Baptist, founded in the 12th or 13th century

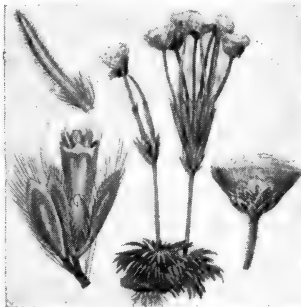
and wife of Amphiaraus. Before he joined the expedition of the Seven against Thebes, Amphiaraus charged his son Alcmaeon to murder his mother as soon as he should hear of his father's death, and in due course Alcmaeon obeyed his behest. See *Alcmaeon*; *Amphiaraus*.

**Eris.** In Greek mythology, goddess of discord. Annoyed at not being invited with the other gods to the wedding-feast of Peleus and Thetis, she threw a golden apple into the midst of the feast inscribed "For the fairest." It was claimed by Hera, Athena, and Aphroditē, and the shepherd Paris (*q.v.*) had to decide.

**Erith.** Market town and urban district of Kent. It stands on the S. side of the Thames, 14 m. E. of



**Erith arms**  
manure, etc. Pleasure grounds have been laid out along the river,



**Eriocaulaceae.** 1. Leaf. 2. Male flower. 3. Entire plant. 4. Head of flower

and the town is the headquarters of several yachting clubs. The chief church is that of S. John the

Baptist, which has some interesting brasses. Parts of it date from the 12th or 13th century. Here is a home for disabled seamen. *Erith* has an interesting history, as it was made a borough in the Middle Ages and in the 17th century was used by the navy. Changes deprived it of both advantages, but it be-

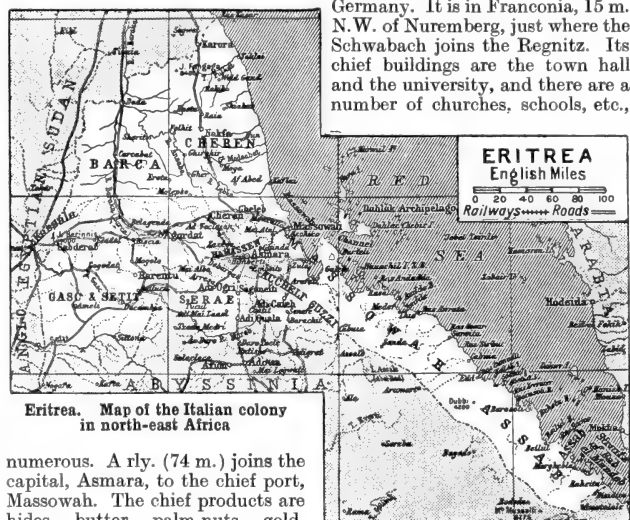
came an industrial centre in the 19th century. Pop. (1921) 31,568.

**Eritrea.** Italian colony situated on the Red Sea. Its coast is about 670 m. long; it is bounded N. and W. by the Anglo-Egyptian Sudan, S. and S.W. by Abyssinia, and on the extreme S. by the French Somali Coast Protectorate. *Eritrea*

contains the following administrative divisions: Massowah, Hamassen, Assab, Acheli Guzzi, Srae, Cheren, Barca, Gasc and Setif. Generally arid and extremely hot, there is yet good pasture for cattle, sheep, and goats, and camels are

cotton. After being alternately in the hands of Turks and Persians, it was taken by the Russians in 1827, and definitely ceded to Russia by the treaty of Turkmanshai, 1828. Pop. 34,000.

**Erlangen.** Town of Bavaria, Germany. It is in Franconia, 15 m. N.W. of Nuremberg, just where the Schwabach joins the Regnitz. Its chief buildings are the town hall and the university, and there are a number of churches, schools, etc.,



numerous. A rly. (74 m.) joins the capital, Asmara, to the chief port, Massowah. The chief products are hides, butter, palm-nuts, gold, ostrich feathers, and mother-of-pearl. Pearls are gathered at Massowah and in the Dahlak Archipelago, which is included in the colony. Massowah was occupied by Italy in 1885, and the surrounding territory was formed into the colony of Eritrea in 1889. Italian enterprise was checked by the disastrous defeat of the Italians by Abyssinian forces at Adowa, March 1, 1896. Area, 45,800 sq. m. Pop., mostly nomadic, 450,000.

**Erivan.** Former govt. in Transcaucasia, since 1918 an Armenian republic. It is bounded by Turkish and Persian Armenia, the prov. of Kars, and the govts. of Tiflis and Elizabetpol. It is a mountainous country, the chief heights being Great and Little Ararat and Alag-yuz, and is watered by the Aras, ancient Araxes. On an island in Lake Goktcha is the famous convent of Sevanga, founded in the 4th century A.D. Minerals abound, especially rock-salt. The inhabitants are chiefly engaged in agriculture and cattle-breeding. The area is 10,000 sq. m. Pop. 1,034,800.

**Erivan.** Town of Transcaucasia, capital of Erivan. It stands on the Sanga, 40 m. N.E. of Ararat and 145 m. S.S.E. of Tiflis. It is the seat of a bishopric and contains the remains of an old palace of the Persian viceroys. An active trade is carried on with Russia and other countries in leather, pottery, and

but none is notable architecturally. The principal industries are the making of beer, paper, and textile goods, the last, to which the town owes much of its prosperity, having been introduced by the Huguenots. The university was founded in 1742 by Frederick, margrave of Baireuth. It has a large library, a botanical garden, and hospital, in addition to laboratories, etc. Erlangen passed in the Middle Ages from one ruler to another. It was made a town in 1398, and until 1791 was in the margraviate of Baireuth; the palace of the margraves is now used for the university. In 1791 it passed to Prussia and in 1810 to Bavaria. Pop. 24,900.

**Erlanger, ÉMILE BEAUMONT,** BARON D' (b. 1866). British financier. Of German parentage, he was born in Paris and educated privately. Naturalised a British subject in 1891, he became interested in many commercial undertakings, and was senior partner of the firm of Emile Erlanger & Co. Baron d'Erlanger was chairman of many companies, was interested in S. Africa, and took a prominent part in the Channel tunnel scheme, being chairman of the Channel Tunnel Co., Ltd.

**Erlau.** Variant name of the city in Hungary better known as Eger. The red wine produced around here is frequently called Erlauer. See Eger.

**Erl-king** OR ERLKÖNIG. Figure in German mythology. He personifies an evil spirit haunting forests and plotting mischief to passers-by, especially children. The word, meaning king of the alders (Ger. *Erle*), from the vapours that cling to these trees at night, is a mis-translation, and should properly be elf-king, its meaning in Scandinavian (Dan. *Ellerkonge*). The character was introduced to German folklore by Herder's translation of the Danish ballad, Sir Olaf and the Erl-king's Daughter, 1778-79. It is the subject of a famous ballad by Goethe, set to music by Schubert.

**Ermeland** OR ERMELAND. Dist. of E. Prussia, Germany. It is a level and sandy region, stretching inland from the Frisches Haff between Elbing and Königsberg. It covers about 1,700 sq. m. The name was borne by a district in Prussia before that country passed into the possession of the Teutonic Order. It was later the principality of a bishop, who was a member of the medieval empire. In 1466 it was added to Poland, but at the partition of the latter in 1772 it was seized by Prussia. There is no town named Ermeland, the chief places being Braunsberg, Allenstein, and Frauenburg, where the bishop had his cathedral. At Braunsberg is the Ermeland Museum.

**Ermine.** Name given to the winter phase of the stoat, when the fur is white with the exception of the black tip to the tail. In Great Britain this change from the brown of summer takes place regularly in Scotland, and often in the N. of England; but further S. it is very rare. The ermine fur of commerce comes from more northern latitudes, chiefly from Alaska; but it is now in little favour, except for official robes. The name is either a corruption of Lat. *Armenius* (*mus*), i.e. Armenian (mouse), or of Ger. *Hermelin*, ermine, ermine-fur.

In heraldry, ermine is the principal fur. It is represented as silver or white powdered with sable spots, usually depicted like a small arrow head surmounted by three dots. There are four variants: ermiones represented as black powdered with silver spots; erminetes or erminettes, represented as black with silver spots between two red hairs; erminois, black with gold spots; and pean, gold with black spots. See Stoat.



**Ermine Street.** Early English name for an ancient British highway from London to Lincoln, and thence to York. Incorporated in part into the Romano-British road system, it passes through London along Kingsland and Stoke Newington to Royston, thence through Godmanchester, Castor, Ancaster to Lincoln. It appears in the laws of Edward the Confessor as one of four royal roads. *See* Britain.

**Ernakulum.** Town of India, the capital of Cochín state. It is the terminus of the Cochín State Rly., which connects the state with the main line of the Madras Rly. The Raja's College here accommodates 700 students. Pop. 21,195, 53 p.c. Hindus, 40 p.c. Christians.

**Erne** or SEA EAGLE. Name given to the white-tailed sea eagle, the only member of its group still found in Great Britain. It is of brownish colour, has a white tail, and is about 3 ft. in length. It still breeds in the Hebrides, but is becoming very rare. *See* Eagle.

**Erne.** River of Ireland. It issues from Lough Gownagh, in co. Longford, and flows mainly N. through Lough Oughter and both upper and lower Lough Erne until it falls into Donegal Bay near Ballyshannon. Its main feature is the Balleck Falls on the lower river. Its length is 70 m. Enniskillen is the chief town on its banks, and after leaving Longford it passes through counties Cavan and Fermanagh.

**Erne.** Name of two loughs or lakes of Ireland. The upper lake is 13 m. long, and in one place 4 m. wide; the lower lake is 18 m. long, and from 2 to 5 m. broad. The river Erne passes through them, the distance between the two being 10 m. The lakes occupy hollows in the limestone, and have a very irregular shape; the upper portion is merely a collection of narrow ponds abutting on the river. In both, but especially in the upper lake, are numerous islands.

**Erne, EARL OF.** Irish title borne since 1789 by the family of Crichton. In 1788 Abraham Crichton, an Irish landowner, was made Baron Erne. His son John (d. 1828) was made a viscount and an earl, and John the 3rd earl (1802-85) changed the spelling of the name to Crichton. He was made a British peer as Baron Fermanagh in 1872, and from him the present earl is descended. The family estates are mainly in counties Fermanagh and Mayo, and the residence is Crom Castle, Fermanagh. The earl's eldest son is known as Viscount Crichton. *Prom.* Cryton.

**Ernest.** Masculine Christian name, probably derived from the German *ernst*, serious. The French

form is Ernest; Ital. and Span. Ernesto. Its comparatively recent introduction into Britain is largely due to the fact that the fifth son of George III was Ernest Augustus, whilst the father and brother of the Prince Consort were named Ernest. The feminine form of the name is Ernestine.

**Ernest Augustus (1771-1851).** King of Hanover. The fifth son of George III of England, he was born at Kew, June 5, 1771. He entered the Hanoverian army and distinguished himself during the Napoleonic wars. In 1799 he was made duke of Cumberland and Teviotdale, and in the House of Lords he acted with the more extreme Tories in opposing all kinds of reform, especially Roman Catholic emancipation and the great measure of 1832. In 1810 some excitement was caused by a murderous attack made on the duke by his valet; the latter was afterwards found dead, and some went so far as to accuse Ernest of his murder.

At one time it seemed likely that Ernest would inherit the English throne, but by the operation of the Salic law he succeeded to Hanover in 1837. There he reigned for fourteen years. He would not hear of anything in the nature of constitutional reform, but in spite of troubles caused by this unyielding attitude he appears to have been popular with his subjects. He died Nov. 18, 1851, and was succeeded by his son George. His wife was Frederica, daughter of Charles, duke of Mecklenburg-Strelitz. *See* photo. p. 2399.

**Ernle, ROWLAND EDMUND PROTHERO, BARON (b. 1852).** British politician and writer. Born Sept. 6, 1852, a younger son of the Rev. G. Prothero, canon of Westminster, he was educated at Marlborough and Balliol College, Oxford, becoming fellow of All Souls in 1875. He was admitted to the bar, did literary work for some years, and in 1894 was made editor of *The Quarterly Review*. An authority on agriculture, he was appointed agent-in-chief to the duke of Bedford in 1899.

In 1914 Oxford University chose Prothero as one of its members, and in 1916 he was included in the Coalition Government as president of the board of agriculture. He continued in office after the general election of 1918, but was made a peer as Baron Ernle,

the name being that of a Wiltshire family with which his mother was connected. He wrote *The Pioneers and Progress of English Farming, 1888*; *English Farming, Past and Present, 1912*; but his most popular works are *Life and Correspondence of Dean Stanley, 1893* (with G. G. Bradley); and *The Psalms in Human Life, 1903*. His only son was killed during the Great War.

**Ernulf** or ARNULF (1040-1124). English ecclesiastic. He was born in France and educated at Bec, under Lanfranc, on whose advice he came to England. Made prior of Canterbury by Anselm, he was abbot of Peterborough from 1107-14, when he became bishop of Rochester. He was a great authority on canon law, and the author of the *Textus Roffensis*, preserved in the library of Rochester Cathedral, which comprises records of the cathedral, and other historical, ecclesiastical, and legal documents. This collection contains the form of excommunication entitled *The Pope's Dreadful Curse*, quoted by Sterne in *Tristram Shandy* to show his veneration for the pious bishop who had ready for use "fit forms of swearing suitable to all cases."

**Erode.** Town of Madras, India. It is in the Coimbatore district, and was at one time a place of some importance. It suffered during successive invasions of the country in the 17th and 18th centuries. The town, which is the headquarters of the divisional officer, contains two old temples. Pop. 16,701, five-sixths Hindus.

**Eros.** In classical mythology, the Greek name for Cupid (*q.v.*).

**Eros.** Nearest of the minor planets, discovered in 1898. The importance of the discovery lay in the fact that it had then approached nearer to the earth than Mars. The asteroid's subsequent nearest approach to the earth was in 1901, when many of the great telescopes of the world, then engaged on the Great Star map, were turned on Eros with a view to determining its nearness. Another near approach is due in 1931.

The task of coordinating the observations of Eros was undertaken by A. R. Hinks, of Cambridge University observatory. By 1909 Hinks was able to announce a most satisfactory result for the distance of the planet, and by implication for that of the sun and of the other members of the solar system. The value of 92,830,000 m. was obtained for the sun's distance, and it was estimated that this result was probably within 30,000 miles of the actual distance. *See* Asteroids; Parallax.



Baron Ernle,  
British politician  
Elliott & Fry



**Erosion** (Lat. *erosio*, eating away). The wearing down of the earth's surface through the action of the atmosphere, rain, rivers, ice, and the sea and its tides. Atmospheric erosion is either chemical or mechanical. Wind transports particles and polishes surfaces over which they are carried, *e.g.* in deserts. Sudden changes of temperature cause particles of rock to split off, subsequently to be removed by wind or water. Atmosphere acts chemically through rainfall, in causing decomposition of rocks. Disintegration of rocks being thus effected, the products are afterwards removed by running water, in most cases the water eroding the boundaries of its course by abrasive action of materials carried.

Erosion beneath the surface of the ground is chiefly chemical, and often results in formation of caves and caverns, especially in limestone districts. Glacial erosion takes place over large areas and on an extensive scale, ice being, under certain conditions, a powerful scouring agent. Marine erosion is in continuous progress along coasts, the sea often using debris broken from cliffs by waves as battering-rams for further destruction. The burrowing of animals, *e.g.* worms, and penetration of roots of plants assist also in disintegration of land surfaces. The general result of all erosion is to lower the level of land. *See* Coast; Glacier; River.

**Erotic Literature** (Gr. *erōtikos*, amatory). Literature inspired by the theme of love. The name is generally applied to poetry, and latterly more especially to poetry of a warmly impassioned character. The classical erotic poets include Anacreon, Callimachus, Sappho, and Theocritus among the Greeks; and Catullus, Horace, Ovid, and Tibullus among the Latins. The troubadours of the Middle Ages carried on the erotic tradition in France, and at the Renaissance this form of literature had a revival on the continent of Europe. In English literature it reached a high level in the lyrical work of poets of the 17th century, such as Donne, Cowley, Herrick, Waller, Lovelace, and Suckling. In the 19th century, more especially in the latter half, it had a recrudescence in the poems of Rossetti and Swinburne, and in France in the writings of Baudelaire and others.

**Er Ram.** Village of Palestine. It is situated on a hill on the Jerusalem-Nablus road. Identified as the ancient Ramah (*q.v.*) of Benjamin (1 Kings xv, 17), it formed a kind of frontier castle between the N. and S. kingdoms of Palestine, and was repopled after the return

from captivity. The modern village was captured by Allenby, Dec. 28, 1917, in the advance following the capture of Jerusalem. *See* Palestine, Conquest of.

**Erratics** (Lat. *errare*, to wander). In geology, portions of rock of varying size which have been moved from their original home by natural agencies. They commonly consist of rock-fragments torn away by glaciers, and often bear scratches resulting from movement under great pressure. They occur in great profusion in glacial boulder-clays, and are often spread over high levels by glacial torrents. *See* Glacier; Rock.

**Errigal OR ARIGAL.** Mountain of Donegal, Ireland, the highest point in Ulster. It is 5 m. S.E. of Gweedore and is 2,460 ft. high.

**Erroll, EARL OF.** Scottish title borne since 1452 by the family of Hay. William Hay, hereditary



20th Earl of Erroll,  
British soldier  
*Lafayette*

constable of Scotland, an honour given in 1315 to his forefather, Sir Gilbert, was made an earl in 1452. The first earls were not very prominent, but Francis, the 9th earl, was active in the 16th century, being constantly in rebellion against James VI. He was then a Roman Catholic, and in league with Spain; in 1594 he led a small rising, after which his residence, Slains Castle, was destroyed. Later he became a Protestant.

A dispute as to whether Erroll or the earl marischal was the rightful constable was decided in favour of the former, and so the earls take precedence in Scotland just after the royal family. When the 13th earl died unmarried his sister succeeded to the title. The great-nephew who followed was a son of the earl of Kilmarnock who was executed for his share in the rising of 1745, but this did not affect his earldom, and from him the later earls are descended. The 18th earl, lord steward of the household, was made a peer of the United Kingdom as Baron Kilmarnock in 1831, and in 1891 his grandson, Charles Gore Hay (b. 1852), became the 20th earl. The earl's estates are in Aberdeenshire, where is his seat, Slains Castle. His eldest son is called Lord Kilmarnock.

**Erromanga.** One of the S. group of the New Hebrides. It measures 30 m. long by 20 wide. The chief anchorage is Dillon's Bay; the chief product, copra.

Here John Williams, the missionary, was killed and eaten in 1839, since when most of the natives have been Christianised. Est. pop. 2,500.

**Error.** False idea which is regarded as true. Errors are due to an appearance of truth, which deceives the subject. When referring to the logical form of the judgement, they are formal, and contradict the laws of thought; when to its content they are material, and contradict the facts.

There are two important classes of error: those which are of so little consequence that they may be neglected, and those which are inevitable, but must be allowed for.

#### Error in Mechanics

Most munition workers were introduced to the necessity for extreme accuracy of measurement in dealing with delicate machinery, and brought to realize that errors of small magnitude but important consequences were unavoidable. They learnt something of the delicacy of modern scientific measurements, and, in many cases, found that the instruments which they used were subject to a constant error, for which allowance had to be made. No scientific investigator uses an instrument for precise measurement without first finding the constant error to which it is subject. Consequently a piece of metal reputed to be 31 ins. in length is almost certainly not precisely 31 ins. If the ruler used is accurately graduated to tenths of an inch the possible error may be  $\frac{1}{10}$  in. too much or too little; this error is solely due to the fact that the ruler only shows tenths of an inch. It becomes a matter of importance to investigate the character of such errors, and statisticians have formulated the "law of error," from which the probable error in the measurement can be calculated.

It is found mathematically that the likelihood that the actual error will exceed the probable error is small, there is only one chance in six that the actual error will be double, and one in 1,388 that it will be five times the probable error. Scientists, consequently, express numerical results in the form  $6.17 \pm 0.02$ , which means that the measured value is probably 6.17, and certainly not more than 6.19, nor less than 6.15, and, further, that there is a very great probability that the error is less than  $\pm 0.01$ , although the possible errors  $\pm 0.02$ .

Errors are sometimes conveniently expressed as percentages, *e.g.*  $\pm 1$  p.c.; and when calculations are made with quantities, each of them subject to a possible error, the final result is subject to a much larger error, *e.g.* if A, B,

and C are measured quantities with possible errors of  $\pm 1$ ,  $\pm 2$ , and  $\pm 3$  p.c. respectively, then the result of computations  $A \times B \times C$ , or  $A \times B \div C$ , or  $A \div B \div C$ , is subject to an error of  $\pm(1+2+3)$ , i.e.  $\pm 6$  p.c.

The practical consequences of these considerations are numerous and important. Unless considerable time and skill be expended over the operation, measurements expressed by more than three significant figures are probably incorrect: it is almost certain, for instance, that a value of 16'34 feet is incorrect; the final 4 is almost certainly wrong, and the 3 may be doubtful. Consequently it is useless to try to measure 18'69 yards or 26'75 cwt. This fact justifies the grocer who weighs butter, etc., to the nearest half ounce.

**Error**, WRIT OF. Name of a writ of appeal to the king's bench in criminal cases, or to the court of exchequer chamber or the House of Lords in civil cases. It was for errors appearing on the record, but it is now abolished in all cases.

**Ersch**, JOHANN SAMUEL (1766-1828). German bibliographer. He was born at Grossglogau, Silesia, June 23, 1766, and studied at Halle. He was successively librarian, 1800, and professor, 1803, at Jena, and principal librarian, 1808, at Halle. His *Handbuch der deutschen Literatur seit der Mitte des 18ten Jahrhunderts*, 1812-14, laid the foundation of modern German bibliography. In 1818 he began, with J. G. Gruber, the famous *Allgemeine Encyclopädie der Wissenschaften und Künste*, which was not completed a century later. He died at Halle, Jan. 16, 1828.

**Erse**. Early Scottish variant of Irish. In the 14th-15th centuries the term was used of kings and

21a Bb Cc Dd Ee

Ff Gg Hh Ii

ll Mm Nn Oo Pp

Rr Ss Tt Uu

**Erse**. Irish Gaelic alphabet of eighteen letters

caterans. In the 18th century it denoted Gaelic speech; at first Scottish Gaelic, and subsequently Irish Gaelic. It is no longer in current usage in this sense. In modern philology it sometimes designates the language-group, embracing Gaelic and Manx, which is now usually called Goidelic. See *Gaelic Language and Literature*; *Goidels*; *Ireland*; *Language and Literature*.

**Ersekújvár**. Town of Czechoslovakia, formerly in Hungary, now known as Nové Zámky. It oc-

cupies an important situation on the Nyitra (Nitra) river, and is both a rly. and road junction, 57 m. by rly. almost due E. of Bratislava (Pressburg). Pop. 16,200, nineteenth-century Roman Catholic Magyars.

**Erskine, EBENEZER** (1680-1754). Scottish divine and founder of the Secession Church.



Ebenezer Erskine,  
Scottish divine

Born at Dryburgh, in Berwickshire, June 22, 1680, the son of a minister, he was educated at Edinburgh University. His first charge was at Portmalk, in Kinross-shire, whence he moved to a church at Stirling. There he came into collision with his ecclesiastical superiors, and the matter came to a head when, in 1732, he declared that parishes should choose their own ministers. This led to his suspension, but with some associates he founded a separate presbytery, which developed into the Secession Church. In this Erskine remained until 1748, when the section opposed to him secured his removal from the ministry. He died at Stirling, June 2, 1754. See *Presbyterianism*; *Secession Church*; consult also *The Erskines*, A. R. MacEwen, 1900.

**Erskine, JOHN, OF DUN** (1509-91). Scottish reformer. He was educated at King's College, Aberdeen, travelled on the Continent, and in 1534 returned with a French scholar, who introduced the study of Greek into Scotland. His enthusiasm was equally divided between the new learning and the new faith. He was an intimate friend of John Knox, and his influence was always exerted in the direction of moderation. He was several times moderator of the general assembly and in 1579 was appointed a member of the king's council.

**Erskine, THOMAS ERSKINE, 1ST BARON** (1750-1823). British lawyer. A younger son of the 10th earl of



1st Baron Erskine,  
British lawyer  
After Hoppner

Buchan, he was born in Edinburgh, Jan. 10, 1750. After a scanty education at Edinburgh and St. Andrews, he entered the navy in 1764, but soon transferred to the army. This career, too, he abandoned after a few years, and in 1778 he was called to the bar.

As a barrister Erskine's success was instantaneous. He made his name in his first case, and in 1781 he added to his reputation when junior counsel for Lord George Gordon. In 1783 he was elected M.P. for Portsmouth, and after six years' absence he was again returned for that borough in 1790. He made no mark in Parliament, but, having been attorney-general and chancellor to the prince of Wales, he was lord chancellor in the Whig ministry of 1806-7. He was then raised to the peerage. He died Nov. 17, 1823. The barony still remains with his descendants. See *Speeches*, ed. J. Ridgway, with *Memoir* by Ld. Brougham, 4 vols., 1847; *Lives of the Chancellors*, Lord Campbell, 4th ed. 1856-57.

Erskine's eldest brother, Henry Erskine (1746-1817), was also a distinguished advocate. Trained at St. Andrews and Edinburgh for the Scottish bar, he was lord advocate in 1783, and again in 1806-7. He was for a short time M.P. and died Oct. 8, 1817. Like his brother, his reputation rests upon his stately and pleasing eloquence. See *Life*, A. Ferguson, 1882.

**Erskineville**. Industrial suburb of Sydney, New South Wales. Pop. 7,299. See *Sydney*.

**Erubescite** (Lat. *erubescere*, to grow red). Ore of copper also known as variegated copper pyrites and as horse-flesh ore. In colour it varies between copper-red and pinkish brown; it is brittle and tarnishes rapidly on exposure; its specific gravity is 5. Chemically it is a sulphide of the metal, its composition being copper 62.8, sulphur 25.7, and iron 11, and traces of impurities. It does not occur in large quantities, but is found frequently with other copper pyrites ores in granite and allied formations in Cornwall, Ireland, Norway, Silesia, Saxony, Siberia, the U.S.A., and Canada. See *Copper*.

**Eruptive Rocks**. Rocks which have been either extruded at the surface of the earth or have consolidated beneath the surface under pressure of overlying rock-masses. Those extruded (effusive rocks), as in volcanic eruptions, are of the type of lava and are found near volcanoes, active or extinct; they frequently exhibit flow-structure, indicating rapid consolidation. Basalts and rhyolites are examples.

Rocks consolidated beneath the surface (intrusive rocks) are of two kinds: very deep-seated (plutonic) and less deep-seated (hypabyssal). Plutonic rocks are usually coarsely crystalline, never glassy or with vapour cavities; hypabyssal rocks are often coarsely crystalline, but show great variation in structure.

Intrusive rocks occur as areas of great extent and irregular shape (batholiths), in spreading sheets forced up from below between other strata (laccoliths and sills), as filling the pipes of old volcanoes (necks), as occupying more or less vertical fissures (dykes), or as branching injections (veins). See *Geology*; *Rock*.

**Erville**s. Village of France, in the dept. of Pas-de-Calais. It is on the Arras-Bapaume road, 6 m. N. of Bapaume. Taken by the Allies in the spring of 1917, it was recaptured by the Germans a year later, and stormed by the British on Aug. 23, 1918. See *Bapaume*, *Battle of*; *Somme*, *Battles of*.

**Ervine**, ST. JOHN GREER (b. 1883). Irish dramatist and novelist. He was born at Belfast, Dec.



St. John Ervine,  
Irish dramatist  
Lena Connell

28, 1883. Notable plays written by him are: *Mixed Marriage*, Dublin, 1911; *The Magnanimous Lover*, Dublin, 1912; *Jane Clegg*, Manchester, 1913; and *John Ferguson*, Dublin, 1916. In 1915 Ervine was appointed manager of the Abbey Theatre, Dublin. In 1916 he joined the Household Cavalry, and being transferred to the Royal Dublin Fusiliers, went with them to the French front. He has also written novels and volumes of short stories, including *Eight O'Clock and Other Studies*, 1913; *Mrs. Martin's Man*, 1914; *Alice and a Family*, 1915; *Changing Winds*, 1917; and *The Foolish Lovers*, 1920.

**Erymanthus** (mod. *Olonos*). Mountain of Arcadia, ancient Greece. The loftiest peak in the Kalliphonia range, it is associated with the story of Hercules and the Erymanthian boar which haunted this region and was slain by the hero. Alt. 7,296 ft.

**Erysipelas** (Gr. *erythros*, red; *pella*, skin). Acute contagious disease due to infection by the micro-organism *Streptococcus pyogenes*. Infection occurs through some injury to the surface of the skin, which may be quite trivial, such as a cut while shaving. It was formerly believed that the disease could arise without a wound, the so-called "idiopathic" form, but it is now recognized that in every case there is some lesion, however small. The skin rapidly becomes swollen and red, the inflammation advancing with a more or less well-defined margin and dying away behind this. The face is most frequently

involved, and the swelling may cause the eyes to close. The temperature rises to 103° F. or more, and delirium may occur.

The duration of the disease is variable, but generally it lasts from one to three weeks. Death in healthy adults is rare, but in aged, debilitated persons and chronic alcoholics the outlook is not so good. Recently delivered women exhibit an increased liability to the disease. Treatment by drugs does not appear markedly to influence it, but some physicians strongly recommend perchloride of iron. Ichthyol has been found to be a useful local application, and belladonna or opium may be employed to relieve pain. Injections of antistreptococcic serum have been used with success. The patient must be strictly isolated.

**Erythema** (Gr. from *erythainein*, to make red). Redness of the skin owing to dilatation of the small blood-vessels. It is usually associated with swelling or infiltration. The condition may be localised, when it may be due to simple inflammation, burning, or irritation by chemical substances; or it may be more or less present over the whole body, when it is usually a symptom of infectious fever, e.g. scarlet fever or measles; or of poisoning by unsound food or certain drugs, particularly belladonna; or is a manifestation of disease of the skin.

**Erythrite** or **ERYTHROL** (Gr. *erythros*, red). Sweet-tasting substance first prepared by Stenhouse in 1848 from several species of lichen such as orchella weed (*Rocella tinctoria*). The lichen is boiled with milk of lime, filtered, and precipitated by adding hydrochloric acid; the precipitate being afterwards purified by crystallisation from alcohol. The name erythrite is also applied to the mineral known as cobalt bloom, a hydrated arsenate of cobalt.

**Erythromelalgia** (Gr. *erythros*, red; *melos*, limb; *algos*, pain). Rare disease characterised by acute pain in the foot, or less frequently the hand, with purplish-red congestion of the skin and moderate swelling. The cause is unknown.



Erzerum. The mountain city of Armenia, once a frontier fortress of the Byzantine Empire. To the right is the medieval citadel

**Eryx** (mod. Monte San Giuliano). Mountain of Sicily near Drepanum (Trapani). It was crowned by a famous temple of Aphrodite, who was locally called Erycina. The temple derived its revenue from 17 Sicilian towns belonging to it. On the W. slope of the mountain is the decayed town of Eryx. Its old Roman walls still exist beside the ruins of the temple. The mountain is 2,465 ft. high.

**Erzberger**, MATTHIAS (1875-1921). German politician. B. at Buttenhausen, Sept., 1875, and educated at Freiburg, he devoted himself to the study of political economy. Early interested in the Christian Socialist movement, in 1897 he was a delegate at the International Conference at Zürich. He entered the Reichstag, and came into prominence when, as a member of the Catholic or Centre Party, he made a speech on July 6, 1917, accusing ministers of misrepresenting the military situation, and at the same time demanding the reform of the Prussian franchise and a statement of the peace aims of Germany. In 1918 Erzberger was secretary of state when Prince Max of Baden was imperial chancellor, and in June, 1919, after holding office in Scheidemann's cabinet, he was minister of finance and vice-premier. He resigned in Feb., 1920, and was assassinated, Aug. 26, 1921.



Matthias Erzberger,  
German politician

**Erzerum**. Vilayet or province of Armenia. It consists of a high plateau traversed from E. to W. by several lofty chains of mountains, in which are the sources of the Euphrates, the Aras, the Chorok, and other rivers. The capital is Erzerum. Area. 19,180 sq. m. Pop. 645,700.

**Erzerum** or **ERZURUM**. City of Armenia. Situated in a wide plain, surrounded by mountains, and lying 6,200 ft. above the sea, it is 120 m. S.E. of Trebizond, its port, and about 150 m. W. of Mt. Ararat,

and is an important commercial town and military position. It is walled, and its streets are narrow and crooked. It has few fine buildings, the chief being the Armenian and Greek churches. Erzerum is the seat of an Armenian bishop.

Its main importance came from its position strategically with respect to Russia. Under the Turks, who occupied it in the 16th century, it was made into a fortress and was the headquarters of an army corps. It was taken by the Russians in 1829 and again in 1878. During the Great War it was captured by the Russians in Feb., 1916, but during the winter of 1917-18 it was abandoned by them by order of the Bolshevik Government, and was reoccupied by the Turks in March, 1918, in spite of strong resistance by the local Armenians. Before the Great War its pop. was approximately 80,000, a large number of whom were Armenians. It was the scene of massacres of Armenians in 1895 and again in 1915.

**Erzerum, CAPTURE OF.** Russian success against the Turks, Feb. 16, 1916. After capturing Köprüköy, Jan. 19, 1916, the Russians under Yudenitch pressed on to Hassan Kale, 23 m. from Erzerum. The enemy retreated to Deve Boyun, a strongly fortified ridge on the east front of that city, and on Jan. 26 Yudenitch stood before it.

The Russian right wing pushed the Turks from Tortum to the Chorok, crossed the mountains, and reached Kara Gubek on the Kara Su, or Western Euphrates, thus threatening Erzerum from the N. The left wing worked its way from the S.E. to Palandoken, capturing the enemy positions there, and menacing Erzerum from the S. On the N. Kara Gubek was taken on Feb. 12, and Tafta, 5 m. nearer Erzerum, on Feb. 13. Yudenitch now attacked the Deve Boyun forts, nine of which fell into his hands on Feb. 15; the defence collapsed, and he entered Erzerum next day. As a military operation its capture was a great feat, considering that it was the depth of winter, that his wings had to advance through high and most difficult mountain country, and that the city itself was protected by many forts. In and about Erzerum the Russians captured 13,000 prisoners, more than 300 guns, and immense quantities of munitions and supplies. The total loss of the Turks was put at 60,000 men. The town was reoccupied by the Turks, March 11, 1918. *See* Caucasus, Campaign in the.

**Erzgebirge** or **ORE MOUNTAINS.** Mountain range of Germany. It is partly in Saxony and partly in

Bohemia, stretching for about 90 m. from the Elbe to the Elstergorge. The highest peaks are the centre, the Keilberg being over 4,000 ft. high. Only a little lower are the Fichtelberg and the Spitzberg. On the south the range has a precipitous face, but on the north, or Saxon side, it slopes more gradually to the plain. The range, as the name suggests, is rich in minerals, silver, lead, tin, copper, iron, and some gold being found here. There are a number of health resorts in the mountains which are visited both for health and pleasure, much of the scenery being very fine. The hills are densely wooded and the district is well served by railways.

**Erzingan, ERZINJAN, or ERZINGHAN.** Town of Asia Minor, the medieval Arsanga. This formerly important military centre of the Turks lies on the W. Euphrates (Kara Su) about 75 m. W. of Erzerum. During the Great War it was the headquarters of a Turkish army corps, and as a military base was second in importance only to Erzerum. It was taken by the Russians in July, 1916. The pop. was 25,000 in 1914, but many of its Armenian inhabitants were massacred in 1915.

**Erzingan, FALL OF.** Russian success, July 26, 1916. After the capture of Erzerum on Feb. 16, 1916, Yudenitch advanced his main forces towards Erzingan, 75 m. distant. In May, however, he was held up at Mamakhatur by the Turks, whose front reached from Baiburt on the N. to Oghnut on the S. At the beginning of July Yudenitch resumed the offensive, took Mamakhatur on the 12th, drove the enemy out of Baiburt on the 15th, and on the 18th captured Kighi, N.W. of Oghnut. From Baiburt he struck W. to Kelkid, almost due N. of Erzingan, marched to the N. and took Gumushkane and Ardasa by July 22, thus making easy his descent on Erzingan from the N. Meanwhile other of his forces had advanced from the E. and S.E., and by July 25 had captured Mertekeli, 8 m. from Erzingan, which he occupied the next day. The fall of Erzingan completed the Russian conquest of Armenia. *See* Caucasus, Campaign in the.

**Erzsebetfalva.** Town of Hungary, in the comitat of Pest Pilis. It is a summer resort,  $7\frac{1}{2}$  m. S.E. of Budapest, on the main line from the capital to Belgrade. Pop. 30,970, including a number of Jews.

**Esarhaddon.** Assyrian king, who reigned 680-668 B.C. His first three years were marked by the rebuilding of Babylon, destroyed by his father, Sennacherib (2 Kings 19). Besides conducting campaigns

against Cilicia, Arabia, and Elam, he sacked Sidon, 676, and Memphis, 670. At Shamaal he set up a stela with his portrait in relief, and erected palaces at Nineveh and Calah. His son Ashurbanipal succeeded him. *See* Sinjerli.

**Esashi.** Town and seaport of Japan, on the island of Hokkaido. It is a port of call on the S.W. coast, 35 m. W.N.W. of Hakodate. Pop. 12,500.

**Esau.** Son of Isaac and elder brother of Jacob, whose great rival he became after the younger brother had secured by a trick the privileges of primogeniture. He became a hunting man, married wives of Hittite nationality, and founded a tribe which occupied the mountains S. of the Dead Sea. In his later days he was on friendly terms with Jacob, but his descendants were always hated and despised by the Jews. *See* Jacob.

**Esbjerg.** Seaport of Denmark, in Jutland. It stands on the North Sea, opposite the island of Fanø, 56 m. by rly. W. of Fredericia, and is the principal port on the W. Jutland coast. The harbour was built in 1868-74, and is state subsidised. Its exports to Great Britain mainly consist of bacon, beef, cattle and dairy produce. The fishing and manufacturing industries



Esarhaddon. Monument excavated at Sinjerli, showing the Assyrian king with an inscription, 670 B.C., detailing his conquest of Egypt

Berlin Museum

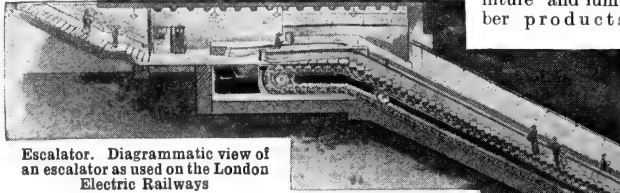
are important and there is cable communication with Calais. Before the construction of the harbour it was a small fishing village. Pop. 18,208.

**Escalade** (Lat. *scala*, ladder). Method of attacking fortifications in the Middle Ages. The walls

Michigan, 72 m. S. by E. of Marquette, it is served by the Minneapolis, St. Paul and Sault Ste. Marie, and other rlys. A favourite summer resort with a fine harbour, it exports iron ore and trades in fish, coal, and other commodities. It has various manufactures, furniture and lumber products

Schelde or Scheldt. See Schelde.

**Eschatology** (Gr. *eschatos*, last; *logos*, discourse). Term used for that branch of theology which deals with death, judgement, the life after death, and the return of Christ to the earth. All ancient religions and some philosophies paid considerable attention to the "doctrine of final things," the teaching of the ancient Egyptians on life after death being especially detailed. The Bible contains little on the subject. The earlier books of the Old Testament appear to take for granted that personality



Escalator. Diagrammatic view of an escalator as used on the London Electric Railways

were reached by the use of scaling ladders or by a staircase or ramp of faggots or similar material placed against them.

**Escalator.** Moving stairway, consisting of an endless chain of steps running round sheaves at the top and bottom of the staircase. Every step is mounted on two two-wheeled trucks, the forward wheel of a truck being out of line with the rear one, so that they may run on separate rails. On the sloping part of the staircase the rear-wheel rails are set higher than the front-wheel, but gradually reach the same level as the horizontal portions are approached; the treads are always horizontal.

The "risers" of the steps are curved to keep close to the treads immediately above them while the steps are moving vertically relatively to one another. The stair-chain is driven by an electric motor. An escalator transports more people than a lift in a given time, vertical travel and power consumption being equal in both cases, costs less in attendance, and is generally more convenient to use. At several stations on the London underground railways it has already displaced lifts; and its use will probably be considerably extended where large numbers of people have to be moved from one level to another.

**Escallonia.** Genus of evergreen shrubs of the natural order Saxifragaceae, natives of S. America. The undivided, leathery leaves are covered with resinous glands which render them somewhat sticky. The tubular white, pink, or red flowers are disposed in small clusters at the ends of branches. *E. rubra* and *E. macrantha* are much grown in the S. of England near the sea as garden hedges. The shrub is named after Escallon, a Spanish traveller.

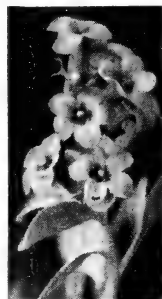
**Escanaba.** City of Michigan, U.S.A., the co. seat of Delta co. On an arm of Green Bay, Lake

being the chief, and rly. workshops. Settled in 1863, it became a city twenty years later. Pop. 14,747.

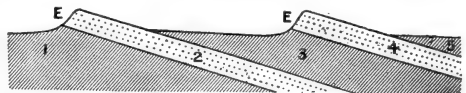
**Escapement.** Part of the mechanism of a clock by which one tooth of a wheel is released or escapes from the pallet at each swing of the pendulum.

**EscarPMENT** (Fr. *escarper*, to cut vertically). Steep face or ridge along which a bed or formation of rock abruptly ends. Escarpments are often found where gently tilted beds of hard and soft rocks occur in alternate layers. The diagram shows a simplified section from Gloucester to London.

First there are the soft layers of the Severn Valley. This is overlooked by the steep face, or escarpment, of the oolitic limestone of the Cotswold Hills. These measures gently dip below plains of soft clay, which in turn are dominated by the escarpment of the chalk Chilterns. Formerly both the chalk and limestone measures extended farther W. The steep southern face of the N. Downs and the abrupt northern face of the S. Downs



Escallonia. Foliage and flower of *Escallonia macrantha*



Escarpment. Sectional diagram illustrating formation of escarpments E.E. 1. Soft layers of lower Severn Valley. 2. Oolitic limestone of Cotswold Hills. 3. Soft layers of middle Thames basin. 4. Chalk beds of Chiltern Hills. 5. Soft layers of London basin

will survive death, and gradually unfold the idea of rewards and punishments after death. The teaching of Christ and His apostles emphasised these truths, but added little to our knowledge. Such passages as the parable of the rich

man and Lazarus and the descriptions in the book of Revelation are couched in the language of Oriental imagery, and were not intended to be taken literally.

The general teaching of the Christian Church on the subject has been marked by great reserve, with the exception of the Church of Rome in the Middle Ages, when the doctrine of purgatory was developed in detail. The present attitude of theologians is one of opposition to speculation on the subject. See Immortality; Survival.

**Escheat** (Lat. *excidere*, to fall out). Term used in law for the reversion of land to its ultimate owner because there is no other heir. It is a relic of feudal times when land was granted by the king or other lord on the condition that in certain contingencies it escheated or came back to him. Land also escheated when the holder was attainted, the theory being that his blood being thus corrupt, his heirs could not inherit. This, however, was abolished in England in 1870. The majority of escheats fell to the crown. Escheat through failure of heirs was recognized by both

**Escaut.** French name of the river generally known as the



English and Scottish law, until it was abolished in 1922. It applied both to freehold and to copyhold land. See Feudalism.

**Eschscholtz Bay.** Inlet of Alaska. An arm of Kotzebue Sound, Bering Strait, near the Arctic Circle, its name commemorates Johann Friedrich Eschscholtz, the Russian naturalist.

**Eschscholtzia.** Botanical name for the perennial herb Californian poppy (*q.v.*).

**Eschwege.** Town of Germany. It stands on the Werra, 38 m. E.S.E. of Cassel, in the Prussian prov. of Hesse-Nassau. The old buildings include a 14th century castle, restored in 1581, and the tower of an 11th century monastery. The industries include weaving and tanning. The town was part of Hesse until taken by Prussia after the war of 1866. Pop. 12,600.

**Eschweiler.** Town of Germany, in the Prussian Rhine prov. It is on the Inde, 8 m. from Aix-la-Chapelle, and stands on a large coal-field. The chief industries are the manufacture of iron, steel, zinc, and copper goods; also brewing, tanning, etc. Pop. 24,718.

**Escombe, HARRY** (1838-99). South African politician. Born July 25, 1838, and educated in London, he emigrated to the Cape in 1859 and joined the commercial staff of The Natal Mercury. After some time in business, he became a solicitor and was elected to the Legislative



Harry Escombe,  
S. African politician  
*Lafayette*

Council of Natal. After a short visit to England he returned to Natal, fought through the Zulu (1879) and Transvaal (1881) wars, and defended Dinizulu successfully against the charge of rebellion. In 1893 he was made attorney-general and devoted himself to developing the commercial resources of the colony. Elected premier in 1897, at the same time being minister of education and of defence, he came to London for Queen Victoria's Diamond Jubilee, and on his return resigned office. He died Dec. 27, 1899.

**Escott, THOMAS HAY SWEET** (1844-1924). British journalist and author. Born at Taunton, he was



T. H. Sweet Escott,  
British journalist  
*Russell*

educated at Bath and Queen's College, Oxford. Lecturer in logic and deputy-professor of classical literature at King's College, London, 1866-73, he edited The Fortnightly Review, 1882-86, for many years leader writer on The Standard, and became a prolific writer on political and social affairs. His numerous books include England: its People, Polity, and Pursuits, 1870; Social Transformations of the Victorian Age, 1897; King Edward VII and his Court, 1903; The Story of British Diplomacy, 1908; monographs on Lord Randolph Churchill, 1895, and Anthony Trollope, 1913; Masters of English Journalism, 1911. He died June 14, 1924.

**Escudo** (Port., shield). Silver coin, monetary unit of Portuguese currency since May 22, 1911.

Divided into 100 centavos, and of nominal value 4s. 5d., it replaced the old milreis gold piece; 2, 5, and 10 escudo pieces are minted in gold, and 1,000 escudos form a conto. The shield with the national arms is on the obverse. In Spain, a silver escudo, equal to 10 reals, was used from 1864-68. In Chile, since 1895, a gold escudo worth 5 pesas has circulated.

**Escorial** (Span. *Escorial*). Palace and monastery of Spain, situated 26 m. N.W. of Madrid, on a spur of the Guadarrama mountains. It was designed for Philip II of Spain by Juan Bautista de Toledo, the first stone being laid April 23, 1563. His pupil, Juan de Herrera, carried on the work, which was completed about 1582. Philip dedicated the building to S. Lorenzo, and intended it to be a retreat to which he could retire and meditate upon his own end. With this idea, he ordered that the structure should be of the plainest character.

It is built of grey granite, in the severest Doric style. The plan is that of an immense rectangle, with a comparatively small rectangular wing, embodying the Palace of the Infantas, projecting beyond the E. side. The gloomy severity of the exterior is emphatic. The façades are pierced by rows of small square windows, each row marking a storey. At each of the four angles of the main structure is a tower 200 ft. in height; other towers rise above the roofs, and there are four flanking the great dome of the church. The main entrance, in the centre of the W. front, is severely Doric, in keeping with the rest of the façade. The door itself is 20 ft. high by 12



Escorial. The palace and monastery, covering nearly 400,000 sq. ft., seen from the north. In the centre is the great church, and the palace, college, and convent occupy parts of the surrounding buildings

ft. wide; above it is a colossal statue of S. Lorenzo, the work of the sculptor Monegro. The head, hands, and feet of this statue are wrought in white marble, but the rest of the figure is granite. This entrance leads into a vestibule 80 ft. wide, flanked on the right hand by the convent, including library and refectory, and on the left by the college.

The central space is occupied by the church, the plan of which was based on the original one of S. Peter's, Rome. The dome and lantern are carried on four enormous piers, from which spring the arches of the three naves. There are 48 side chapels, and below the high altar is the famous Pantheon, containing the tombs of the kings and queens of Spain. The decoration of this octagonal chamber, consisting of precious marble linings, dates from 1654; more interesting art treasures are the paintings distributed over the church, particularly those by Tintoretto, El Greco, Zurbaran, and Ribera in the sacristy, and the masterpieces of Coello in the chapels.

On the N. side is the palace, in the N.E. corner of which were the apartments of Philip himself. In the room in which he died was a panel, by opening which the king could look down upon the high altar of the church. Other apartments of the palace were added to and embellished by later monarchs, the bulk of the decoration belonging to the 18th century. Philip II was the founder of the Escorial Library. Don Diego de Mendoza, the Inquisition, and Augustin, archbishop of Tarra-gona, were other donors, the collection being further increased by confiscated libraries, and by the rule that a copy of every book published in Spain should be presented to it.

The Hermits of S. Jerome were the first tenants of the monastery, which was stormed in 1807 by French troops; only part of the looted treasure was restored at the peace of 1814. *See* Architecture.

**Escutcheon** (old Fr. *escuchon*, Lat. *scutum*, shield). In heraldry, term used to describe a shield blazoned with armorial bearings or other insignia. *See* Shield.

**Esdraelon**, PLAIN OF. District of Palestine. It is sometimes called the plain of Jezreel, a term which applies more specifically to its eastern extension towards the Jordan. An historic tract of country, it has been the scene of many battles, from Gideon's victory over the Midianites to the actions fought by Allenby's cavalry in his conquest of the Holy Land. It lies

S.E. of Haifa, between Mt. Carmel and the Mountains of Gilboa, in N. Palestine, and is the Armageddon of the Apocalypse. Watered by the Kishon, the plain is very fertile. During the Great War the British, after defeating the Turks at El Lejjun, a village on its S. edge, marched across it to Nazareth in Sept., 1918.

**Esdras**, THE BOOKS OF. Several works bear the title Esdras. One of these (O.T. Apocrypha) contains substantially the same materials as the Biblical books known as Ezra, Nehemiah, and II Chronicles. In the Septuagint and in the Latin and Syriac versions this is called I Esdras; but in Latin bibles since the time of Jerome, III Esdras (the O.T. books of Ezra and Nehemiah being reckoned as I and II Esdras). Modern scholars prefer to call it "Greek Esdras." The other work in the O.T. Apocrypha is commonly called II Esdras, but sometimes IV Esdras. It contains seven visions, and is the only specimen of Apocalyptic Literature in the O.T. Apocrypha. I Esdras was used by Josephus, and may have been composed in the first century B.C. II Esdras was probably written in the reign of Domitian (A.D. 81-96). The author appears to have witnessed the destruction of Jerusalem in A.D. 70 (iii, 1); and in the Eagle Vision the eagle seems to represent Rome.

**Esdud**. Village of Palestine. On the Mediterranean, it occupies the site of ancient Ashdod (q.v.).

**Eserine Sulphate**. The sulphate of an alkaloid extracted from *Physostigma venenosum*, the Calabar bean. It produces contraction of the pupils, and in minute doses is useful in various affections of the eye. In large doses it is very poisonous.

**Esh**. Village and parish of Durham. It is 5 m. W. of Durham, and is a mining centre. Near here, at Ushaw, is the Roman Catholic college of S. Cuthbert, the successor of the one at Douai. It has a collection of pictures and antiquities, while its chapel was designed by Pugin. S. Michael's is the chief church. Pop. 1,075.

**Esher**, Parish of Surrey, England, a residential suburb of London. It stands on the Portsmouth Road near the little river Mole. Pleasantly situated it is 15 m. S.W. of

London by the L. & S.W. Rly. Esher Place, beside the Mole, built by William of Waynflete in 1460, and now represented by a ruined tower, was the residence of Wolsey after his fall in 1529. One mile S. of the town is Claremont (q.v.). Pop. 2,609. The urb. dist. includes Esher, Thames Ditton, and Long Ditton. Pop. 12,518.

**Esher**, WILLIAM BALIOL BRETT, 1ST VISCOUNT (1817-99). British judge. The son of a clergyman, he was born Aug. 13, 1817, and went from Westminster School to Caius College, Cambridge. In 1840 he became a barrister, and after some successful years at the bar entered the House of Commons as Conservative M.P. for Helston in 1866, a tie at this election ending in the House allowing both candidates to sit. In 1868 Brett was made solicitor-general, but very soon he left political life to become a judge of the court of common pleas. In 1876 he was promoted to be a lord justice, and in 1883 to be master of the rolls. He retired in 1897, and died May 24, 1899. In 1885 Brett was made Baron Esher and in 1897 was raised to the rank of viscount.

**Esher**, REGINALD BALIOL BRETT, 2ND VISCOUNT (b. 1852). British publicist. Born in London, June

30, 1852, he was the son of William Baliol Brett, the judge, created Viscount Esher in 1897. Educated at Eton and Trinity College, Cambridge, he was Liberal M.P. for Penryn and Falmouth 1880-85. He was secretary to the office of works 1895-1902, and enjoyed the confidence of both Queen Victoria and Edward VII, under whom he was deputy-governor of Windsor



*Esher*  
Beresford



Esher. The old parish church of S. George, disused since 1853. One of the bells was brought from S. Domingo Island by Sir Francis Drake

Castle. Esher took a great interest in the Territorial Force. He was on the committee of imperial defence, and in 1904 was chairman of the committee appointed to inquire into the constitution of the war office. He wrote *To-day and Tomorrow and Other Essays*, 1910; and, with A. C. Benson, edited the *Letters of Queen Victoria*, 1907.

**Eshowe.** Town of Zululand, Natal. It is 30 m. S.S.E. of Ulundi, and there are asbestos mines in the neighbourhood. It was besieged for a time by the Zulus during the Zulu War of 1879. Pop. 1,523.

**Esk.** River of Great Britain Formed by the confluence of the Black Esk and White Esk, which meet in Eskdalemuir, it flows for 35 m. through Dumfriesshire and Cumberland to the Solway Firth, about 5 m. below Longtown.

**Esk.** River of Midlothian, Scotland. It is formed by the junction of the N. Esk and S. Esk in Dalkeith Park, flowing thence  $3\frac{1}{2}$  m. N. to the Firth of Forth at Musselburgh.

**Esk, NORTH.** River of Kincardineshire and Forfarshire, Scotland. It is formed by the junction of the Lee and Mark, which unite at Invermark, and flows S.W. for 29 m. to the North Sea,  $4\frac{1}{2}$  m. N.N.E. of Montrose.

**Esk, SOUTH.** River of Forfarshire, Scotland. It rises in the Grampian Mts. and flows 49 m. S.E. and E. to the North Sea at Montrose.

**Esker** (Irish *eskar*). Long, winding ridge of coarse gravel and sand. Formed by torrents of water released from glaciers, eskers are situated in areas formerly occupied by ice-dumps.

**Eski-Djumaia, -JUMA OR -JUMAYA.** Town of Bulgaria. It is situated on the rly. from Sofia to Varna, about 16 m. W. of Shumla. Pop. 10,000.

**Eskilstuna.** Town of Sweden, in the prov. of Södermanland. It stands on the Hjelmär river, between the Mälär and Hjelmär lakes, 60 m. W. of Stockholm. Known as the Sheffield of Sweden, it has iron-foundries, steel works, a royal arms factory, and a technical school. It is celebrated for its cutlery and damascened work. Named after S. Eskil (d. 1181), the English apostle in Södermanland, its 12th century monastery was destroyed by fire in 1680. Pop. 28,485.

**Eskimo** (Abenaki, raw flesh-eater). Primitive race inhabiting arctic America. Numbering (1911) about 12,500, Greenland; 14,000, Alaska; (1915) 1,099, Siberian coast; and 3,447, Canada, their geographical range of 5,000 m. is the widest of any aboriginal race in the world. The Danish form *Eskimo* has displaced the French *Esquimaux*. The

Hudson Bay "husky," used of man and dog, is a colloquial variant. The native name is Innuvit (men).



Eskimo man in hunting dress

Long-headed, broad-faced, lank-haired, and of a yellowish brown colour, an origin in prehistoric Europe is suggested. Thus, besides their seal-food, they still hunt musk-ox and reindeer. Their bone arrow-heads, harpoons, shaft-straighteners, and ornaments, their stone lamps and ivory engravings—almost reaching picture-writing—support this view, which, however, has recently been contested in favour of relationships more definitely mongoloid. That they crossed by the Bering Strait is undisputed, so that a pre-American habitat in N. Siberia is a reasonable inference. The claim that they extended at one time to the Scandinavian, and even to the N. coasts of Britain, is less fully established. Their one-man skin canoes (kayak), transport boats (umiak), summer tents of skin, winter huts of turf and stone, migrant snow-houses (igloo), harpoon floats, dog sledges, cairn-burials, all betoken an intelligent adaptation to adverse conditions.

The language-stock, with its many dialects, attests a long ancestry, anterior to their American advent. Their animism embraces a crude magic, governed by medicine-men (angakok), akin to African witch-doctors rather than Siberian shamans. Their communal life recognizes no national chiefs; tribal warfare is unknown. Their ample folklore points to a belief of some tribes in a woman of the sea, perhaps Scandinavian, of others in a moon-god. The Aleuts of the Aleutian Islands are a self-contained branch of the race, exhibiting traces of Asiatic rather than American Indian contact. A tribe of blond Eskimo was discovered by Stefansson during his 1909-11 expedition on Coronation Bluff, far in the Arctic Zone. See *Aborigines*; *Ethnology*; also illus. p. 561.

**Bibliography.** The Central Eskimo, F. Boas, 1888 (Smithsonian Institution: Bureau of Ethnology); The People of the Polar North, K. Rasmussen, compiled from the Danish by G. Herring, 1908; The Labrador Eskimo, E. W. Hawkes, 1916.

**Eskimo Dog.** Breed of dogs kept by the Eskimos of Arctic America. They are little more than domesticated wolves of the district. The practice of crossing the females with wild wolves tends to check those modifications which domestication produces.

The Eskimo dog has a sharp muzzle, upright ears, rough coat, and a bushy tail. Though usually of the colour of the wolf, black-and-white specimens are not uncommon. Like the wolf, it does not bark, but howls. The dogs are fed on frozen fish, but in spring often find birds and eggs. Their usual drink is snow. They are employed for sledge drawing, about eight being usually yoked



Eskimo Dog. Specimen of the breed, closely akin to the wolf

together. When the going is good a dog will draw on an average over 300 lb. for 35 m. in a day. See illus. facing p. 2624.

**Eski-Sagra.** Alternative name for the Bulgarian town better known as Stara-Zagora (*q.v.*).

**Eski Shehr** (Turk., old city). Town of Asia Minor, the ancient Dorylaeum. This important town, with its rich deposits of meerschaum and considerable trade in pipes of that material, stands on the Pursak Su. It is the junction at which the main rly. from the Bosphorus divides into two, one branch going E. to Angora and the other S.W. to connect on the W. with the Smyrna rly., and on the E. with the Bagdad rly. Pop. 20,000. See illus. p. 683.

**Esla.** River of Spain. It rises on the S. slopes of the mts. of Asturias, in the N. part of the prov. of Leon, and flows a generally S.W. course to discharge its waters into the Douro, 16 m. below Zamora. It has a length of 120 m.

**Eslava, MIGUEL HILARION** (1807-78). Spanish music composer. Born near Pampeluna, Oct. 21, 1807, he became master of the choir in Ossuña cathedral in 1828. He moved to Seville in 1832, and was appointed *maestro* at the cathedral, and to a similar position at the court of Isabella in 1844. He died at Madrid, July 23,

1878. He wrote three operas, *El Solitario*, 1841; *Las Treguas de Tolemaida*, 1842; *Pedro el cruel*, 1843; and about 150 masses and other pieces of ecclesiastical music.

**Esmarch**, JOHANNES FRIEDRICH AUGUST VON (1823-1908). German surgeon. Born Jan. 9, 1823, at Tönning, Slesvig-Holstein, he studied at Kiel and Göttingen, served in the wars of 1848 and 1864, and, in the Franco-Prussian war, 1870-71, was surgeon-general to the army. Afterwards he specialised in hospital management and military surgery. He invented an indiarubber bandage for field work and temporary dressing. Of his many works three have been translated into English.

**Esmeraldas**. Maritime dept. of N.W. Ecuador, S. of Colombia, S. America. The surface is broken and hilly, but there are the open pasture valleys of the Esmeraldas, Cayapas, and other rivers. The hills are heavily forested, yielding many kinds of timber. Although the mineral resources have not been largely exploited, gold and platinum are found. Area, 7,430 sq. m. Pop. 14,600. Esmeraldas, the capital, is a Pacific port at the mouth of the Esmeraldas, 96 m. N.W. of Quito. It manufactures tobacco and exports rubber, cacao, sugar, fruit, and cattle. Pop. 3,020.

**Esmond**. Novel by Thackeray published in 1852, the full title being *The History of Henry Es-*

mond for her mother. This vivid and fascinating story is a masterly presentation of early 18th century life and manners; the illusion as to its having been written by a man of the very time with which it deals is complete.

**Esmond**, HENRY VERNON (1869-1922). Stage and pen name of Henry Vernon Jack, British dramatist and actor. He was born at Hampton Court, Nov. 3, 1869, was educated privately, and went on the stage in 1885. He was the author of many plays, some of which enjoyed considerable popularity. They include *Bogey*, 1895; *The Divided Way*, 1895; *One Summer's Day*, 1897; *Grierson's Way*, 1899; *The Wilderness*, 1901; *The Sentimentalist*, 1901; *My Lady*



Henry V. Esmond, British dramatist  
Virtue, 1902; Under the Greenwood Tree, 1907; A Young Man's Fancy, 1912; Eliza Comes to Stay, 1913 (previously called Sandy and His Eliza); The Dangerous Age, Vaudeville, 1914 (previously called The Dear Fool). He died April 17, 1922.

**Esneh** or ESNA. Town of Egypt. It is on the W. bank of the Nile, 36 m. by rly. from Luxor. It is identical with the Tesnet of ancient Egypt, but was called Latopolis by the Greeks, after the locally venerated *latos* fish.

The chief object of interest is the temple of Khnum, which was embellished by Roman emperors from Titus to Decius (251). A subterranean Coptic church was identified here in 1895. The barrage at Esneh ensures adequate irrigation for a large tract of land.

**Espagnols-sur-Mer** (Fr., Spaniards on the sea). Name given to a

sea fight that took place off Winchelsea between the English and the Castilians, Aug. 29, 1350. The two peoples were not actually at war, but the Castilians had helped the French in the war then raging. Moreover, acts of piracy had been committed on both sides.

The sequel was an attack on a Castilian fleet of armed merchantmen as it was returning from

the Netherlands to Spain. Under the command of Edward III the English fleet was assembled at Winchelsea, and there the Castilians, nothing loth, joined battle with them. This was rather an encounter of soldiers than of sailors. Crossbowmen on the Castilian ships did much execution, and lying side by side, the crews of each fought hand to hand. In Cog Thomas, King Edward and his nobles took a gallant part, and this ship was sunk just as the royal party had boarded an enemy vessel. Forty or fifty ships were engaged on either side, the Castilians being the larger. Night, rather than a decision, put an end to the combat, which is described by Froissart.

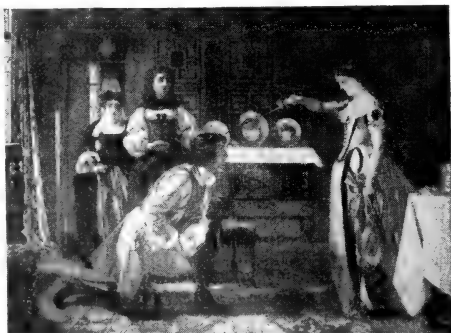
**Espalier** (Fr.). Shape or form of fruit-tree which has been trained from its earliest or budded stage. An espalier consists of a main root stem, the original stock, from which fruit branches in tiers extend horizontally right and left, one above another. During the year after budding, when the side-shoots make their appearance, all should be removed except three, which should be grouped close together. One of these shoots is trained upwards to form a continuation of the main stem, and the remaining couple are coaxed by sticks and strings to grow right and left, parallel with the surface of the ground. When the main stem produces three more buds suitably situated, the process is repeated at a distance of about one foot above the original tier. The word seems to have originally denoted the trellis-work on which the trees were trained. See illus. p. 497.

**Espartero**, BALDOMERO (1792-1879). Spanish soldier and statesman. Born Feb. 27, 1792, at Gran-



B. Espartero, Spanish soldier

átula, Ciudad Real, of humble parentage, he fought against Napoleon in Spain, and afterwards against the rebels in S. America. Again in Spain, he obtained several successes against the Carlists, and in 1839 concluded the treaty of Vergara, which ended the war. Turning to politics, he became prime minister, and from 1841-43 was regent, but in the latter year he fell from power and passed the next few years as an exile in England. Pardoned, he returned to Spain in 1848, and from 1854-56 was again premier. In 1868 he was put forward as a candidate for the throne, and later was made prince of Vergara. He died Jan. 9, 1879.



Esmond being knighted by Beatrix. From a painting of a scene in Thackeray's novel, by Augustus L. Egg

Tate Gallery

mond, a colonel in the Service of Her Majesty Queen Anne. Written by Himself. The hero, true heir to the Viscount Castlewood, though he magnanimously destroys the evidence of his right, tells his own story from boyhood and as soldier through the campaigns of Marlborough, and so to the end when his adoration of the lofty Beatrix has changed into devoted affec-

**Esparto Grass** (*Stipa tenacissima*). Tall perennial grass of the natural order Gramineae. It is a native of S.



Esparto Grass

Europe and N. Africa, where it grows in rocky soil. Its leaves are rolled in from the edges, so that they appear thread-like. Being tough and wiry, it is used in the manufacture of ropes, mats, and a very durable kind of paper. For the latter purpose many thousands of tons of the grass are imported into Britain annually. As a crop it yields about 10 tons per acre. See Paper.

**Esperance.** Harbour of W. Australia. It is situated on the S. coast, 220 m. N.E. of Albany. Gold from Coolgardie is shipped here. Pop. 239.

**Esperanto.** International language invented by Dr. Zamenhof, an oculist of Warsaw. Completed in 1878, and first published in 1887, it has since made great strides, the number of Esperanto societies rising from 26 in 1901 to 2,700 in 1913. The alphabet consists of 28 letters, none of which offers any difficulty to English-speaking people. The omission of Y, however, and its representation by J may at first cause slight confusion. The following are the terminations of words: -o, noun (nominative); -a, adjective; -j, plural; -n, objective (accusative); -e, adverb; (tenses) -as, present, -is, past, -os, future; (active participles) -anta, present, -inta, past, -onta, future; (passive participles) -ata, -ita, -ota.

The passive is formed by the aid of *esti*, to be, the tense required being indicated by the proper participle. About 30 prefixes and suffixes are employed to form derivatives; e.g. *mal-*, indicating the exact contrary: *bona*, good, *malbona*, bad; -il, instrument; *haki*, hew; *hakilo*, axe; -ist, trade or occupation; *boti*, boot, *botisto*, bootmaker; *ig-*, factitive (causing an action), *bruli*, burn, *bruligi*, cause to burn. Compounds are formed by combining the root or simple forms of words: *fervojo*, railway, iron way. The word *gesamsideanoj* (people of the same idea) is a good illustration of word-formation; *ge* denotes males and females; *sam*, same; *ide*, idea; *an*, a partisan; *o*, noun ending; *j*, plural. There is an ingeniously constructed table of correlative words—demonstrative, indefinite, inclusive, negative, and relative.

The language is easily learned, every rule being without exception, the spelling phonetic, and the vocabulary surprisingly small.

International congresses have been held annually since 1905, except during the years 1914-18, at Boulogne, Geneva, Cambridge, Dresden, Barcelona, Washington, Antwerp, Cracow, Berne, Paris, San Francisco, and (Aug., 1920) The Hague. These have been attended by representatives of 30 or more countries, with an attendance varying from 1,000 to 4,000. The language is controlled by an international academy and a language committee, and the organization of the movement by the central office at 51, Rue Clichy, Paris. Many eminent philologists have pronounced warmly in its favour. It is officially taught in a number of colleges and schools. Many firms now use it for business purposes, and there is a growing demand for competent teachers.

There is a flourishing literature, translated and original, and some 70 Esperanto periodicals are now published regularly. The language is recognized by the British Post Office, and has received much government support in other countries. It is claimed that the general adoption of Esperanto as an auxiliary language for international use would remove one of the chief obstacles in the way of world-peace, facilitate the working and effectiveness of international congresses, save money and effort now spent on translations and interpreters, lighten the curricula, and increase the efficiency of schools, render literary masterpieces and scientific works accessible to the world, and facilitate the study of other tongues, besides its obvious utility in travel, science, commerce, and in all branches of human activity. The headquarters for the British Empire is The British Esperanto Association, Incd., 17, Hart Street, London, W.C. The Universala Esperanto-Asocio, 14, Museumstrasse, Berne, deals with the practical application of the language to business, travel, etc. See Language; Phonetics; consult also International Language, W. J. Clark, 1907.

**Esperanza, La.** Town of Honduras, capital of the dept. of Intibuca. It stands on a plateau at an alt. of nearly 5,000 ft. above sea level, 45 m. W.N.W. of Tegucigalpa. The Indian city of Intibuca is adjacent. Pop. 11,453.

**Espinal.** Town of Colombia, in the dept. of Tolima. It stands at an alt. of 1,020 ft., 25 m. N.E. of Purificación, and 75 m. S.W. of

Bogotá. It is the centre of an agricultural district, producing coffee, cocoa, and tobacco, and manufactures pottery. Pop. 10,010.

**Espionage** (Fr. *espion*, spy). Aiding an enemy by supplying information otherwise than as a belligerent engaged on reconnaissance duty, or as a citizen openly helping his own country. The soldier if captured must be treated as a prisoner of war; a civilian may be guilty of a war crime, such as war treason, but in neither case, if no dissimulation has been practised, is the offence that of espionage.

Espionage as defined by the Hague Rules was extensively employed during the American Civil War of 1861-65, and as the belligerents spoke a common language, the offence was hard to detect. A favourite plan of the "couriers" was to be captured by the enemy, and as prisoners of war, on the way to the enemy's base, to make a careful study of his camps and depots. When the hour approached for internment, an escape was effected, the outpost lines recrossed, and a report prepared. British officers on the retreat from Mons in Aug., 1914, testify to the execution of two German officers, who, dressed in the correct uniform of the British staff, made a tour of British positions in a British motor-car, and in faultless English questioned the troops at important points. In Westminster Abbey lie the remains of John André (*q.v.*), an English soldier, who was hanged as a spy in 1780, during the American War of Independence. Even in time of peace soldiers are employed as agents of the Intelligence Departments to visit other countries and obtain information by stealth. General Baden-Powell has described his own adventures as one of these agents. He cannot be regarded as a spy, since his investigations had no reference to an actual enemy. On the other hand, he was knowingly breaking the laws of the country visited in pursuing illegitimate inquiries, and so risked a term of imprisonment.

The methods by which Germany obtained information of economic and military value in peace time are peculiar. An insurance office in Paris would afford a pretext for the employment of German reserve officers to tour the E. of France, ostensibly in search of clients. An offer was made to a French insurance office to relieve it of all risk in respect of important clients such as the Creusot Works, and thus the German agency was furnished with daily reports in regard to the staff and also the material of war manufactured by the French company.



Such an act is not criminal ; and in time of peace no question of espionage in a military sense can arise. Yet to the popular mind the term spying would seem appropriate. Even in war time, it is difficult to define the offence committed by a Swiss concern which, in 1915, invited 10,000 French families to send the address of a French soldier to whom a present of tobacco would be acceptable. The addresses thus obtained were forwarded to Germany as an indication of the whereabouts of French units. Carl Lody, a German ex-officer, was discovered during hostilities to be collecting information about the British navy and sending it to Germany. He was tried by court-martial for war treason and shot. As he was avowedly serving his country outside the war zone, he became a war criminal under British law ; similar action within the zone of operations would have involved espionage, according to the Hague Rules.

It may be concluded, then, that almost any act done in the interests of the enemy after war has been declared, by whomsoever committed, is a war crime, but whether it is to be classed as espionage or war treason depends upon the circumstances. See Secret Service; Spy.

**Espirito Santo.** Maritime state of S.E. Brazil. It is bounded N. by Bahia, W. by Minas Geraes, E. by the Atlantic, and S. by Rio de Janeiro. Hilly in the interior and on the W., where runs the Serra dos Aimores and the Serra do Mar, elsewhere it is level, and in parts marshy. Well watered by the Rio Doce and its tributaries, it produces coffee, sugar, cocoa, tobacco, rice, and salt ; its forests yield valuable timber and drugs. The Parahyba do Sul flows along the S. boundary. The mining resources of this region are not yet tapped, but deposits of iron ore are known to exist. Three rlys. serve the state. Education is backward. The capital is Victoria, on the bay of Espirito Santo. Area, 17,308 sq. m. Pop. 434,512.

**Espiritu Santo.** Largest and westernmost of the New Hebrides, Pacific Ocean, in lat. 15° S., long. 167° E. It is 65 m. long by 20 m. wide, and mountainous, attaining an altitude of over 5,000 ft. Maize, coconuts, millet, coffee, and bananas are grown. Trade is mostly with Sydney. Area, 1,850 sq. m. Pop. 20,000.

**Espit des Lois, DE L'.** Title of a great work by Montesquieu. It is divided into 31 books, each of which contains a number of short chapters, some only a few lines in length, and made a big quarto volume. Published anonymously at Geneva

in 1748, it has been many times reprinted. It is a comprehensive survey of the nature of laws and government "almost unique in its entire freedom at once from doctrinarism, from visionary enthusiasm, from egotism, and from an undue spirit of system." Its contents may be expressed by its subtitle, "the relation which laws should have to the constitution of every government, to manners, climate, religion, commerce, etc."

**Espronceda,** JOSÉ DE (1810-42). Spanish poet. Born near Almedra lejo, Estremadura, he was educated at the college of S. Matthew, Madrid, and before the age of 15 was imprisoned as a member of a revolutionary secret society. On returning to the capital he found himself suspect, and after a further spell of incarceration escaped to England. In London he studied Shakespeare, Milton, and Byron (by whom he was most markedly influenced), and while there wrote his fine ode *A la Patria* (1829). In 1830 he was in Paris, fighting in the brief revolution there. On the amnesty after the death of Ferdinand, 1833, he returned to Spain and entered the queen's bodyguard, but was cashiered for writing a political song. Journalism, novel-writing, and various revolutionary movements occupied him for a few years, and in 1841 he became secretary of the embassy at the Hague. In 1842 he returned to take his seat in the Cortes as deputy for Almeria. He died May 23, 1842.

Showing early gifts as a poet, he gained a leading position among 19th century Spanish writers, and his influence on his successors was marked. His best work was of a lyrical and self-revealing character, as is seen in the Don Juan-like narrative, *The Student of Salamanca*, and the Faust-like *The Devil-World*. See Spain: Literature; consult also Modern Poets and Poetry of Spain, J. Kennedy, 1852; Hist. of Spanish Literature, J. Fitzmaurice-Kelly, 1898.

**Esquiline Hill** (*Mons Esquilinus*). The highest of the "seven hills" on and around which ancient Rome was built. Lying between the Caelian and the Viminal, in the original city it was regarded as including the Oppian, Cispan, and Fagatal. On the Esquiline were

the Colosseum (*q.v.*), erected on the site of the Golden House of Nero, and the *thermae*, or warm baths, of Titus and Trajan. See Rome.

**Esquimalt.** Port of British Columbia, Canada. It is on Vancouver Island, 3 m. from Victoria. It has a magnificent harbour and is the Pacific coast headquarters of the Canadian navy, for which



Esquimalt, British Columbia. View of the harbour, one of the safest and best defended on the Pacific coast

there is a dockyard and other naval establishments. The town is served by the C.N.R. and C.P.R. The industries include shipbuilding and oyster culture. Pop. 4,700.

**Esquire** (old Fr. *escuyer*, shield-bearer). Title of honour. The word, originally denoting one who bore the shield for a knight, became a title of honour below the rank of knight. Among those legally esquires are sons of peers, the eldest sons of baronets and knights, justices of the peace, and barristers.

**Essad, AHMET, PASHA** (1863-1920). Albanian soldier and politician. Descended from the Top-tani family,



Essad Pasha, Albanian soldier and politician

hereditary claimants to the Albanian kingship, Essad first entered the Albanian army. He served in Macedonia and Albania on the side of Turkey, and was rewarded for services against Greece, 1897, with the title of pasha. The assassin of Essad's brother, hired by Abdul Hamid, was slain by Essad in Constantinople, but soon after the sultan made him commander of *gendarmérie* at Janina.

In 1908 Essad headed the depuration which announced to Abdul his deposition, and in the Balkan war of 1912 heroically defended Scutari against the Greeks. During the short reign of Prince William of Wied as mporet, Essad was the real ruler of Albania and

attempted an abortive *coup d'état*, was arrested but released, and after the *mpret's* departure made himself head of the provisional government, Oct. 5, 1914.

In Jan., 1916, he sided with the Allies. In Feb. the Austrians overran Albania, and Essad escaped to Salonica. His connexion with the Serbians, whom he had aided in their 1915 retreat, made him distasteful to the Italians who occupied Albania after the Austrian retreat, 1918, and he was not allowed to return there. He lived for some months in Paris, and was murdered by an Albanian student, June 13, 1920. *See* Albania.

**Es Salt.** Village of Palestine. Identified as the ancient Ramoth (Deut. iv, 43; Josh. xx, 8), it is 15 m. N.E. of the crossing of the Jordan at El Ghoraniyeh, 20 N.E. of the N. end of the Dead Sea. Situated at an elevation of 2,740 ft. above the sea, it is the capital of the Kadā (division) of El-Belkā. Wine and raisins are produced in the district. The inhabitants are two-thirds Moslems, the rest Greeks, Protestants, and Roman Catholics. During the Great War it was a large depot of the Turks, who when they retired from it, April 1, 1918, brought away some thousands of Jewish, Syrian, and Armenian refugees. On April 30 Allenby resumed operations E. of the Jordan, and Australian mounted troops entered Es Salt. It was evacuated May 3, when Allenby withdrew his whole force to the Jordan crossings. *See* Palestine, Conquest of.

**Essay** (Fr. *essai*, attempt; Lat. *exigere*, to examine). Literary composition, generally in prose, of a short and informal character. The origin of the word is the same as that of assay, for at first it was taken as indicating a testing or trying of a subject. The word has, however, at different times been applied to a great variety of compositions, embracing at once the sententious brevities of Bacon and the fullness of such a philosophical work as that of Locke, *On the Human Understanding*. It is also applied to certain of the didactic poems of Pope.

Montaigne (16th century) is generally regarded as the originator of the modern essay, as he was the first to employ the word as title for his pleasantly discursive and personal writings; yet, as Bacon, the earliest notable master of the English essay, wrote, "the word is late, but the thing is ancient." Bacon's *Essays*, 1597, are mainly a succession of pithy maxims, and differ greatly from the essay as it was evolved during the succeeding centuries; for it was rather from

the Frenchman than from their countryman that the English essayists derived. Ignoring its use as something of an apologetic prefix to philosophical and historical studies, and its employment in poetry by Pope and some of his imitators, the history of the essay in English literature may be followed in a record of some of its exponents.

Abraham Cowley, the first English author to write in the easy, familiar, personal style of Montaigne, though he frequently rounded off his essay with a poem on its theme, or wrote the essay as little more than introduction to a poem, may be called the father of the familiar essay in English. It was with Richard Steele and Joseph Addison that the essay established itself as a popular form of literary composition. Their personal studies in essay form in *The Tatler* and *The Spectator* are regarded as adumbrating the English novel; as two laughing philosophers, with their genial comment on men and affairs in periodical essays, they established a form of the composition which continued throughout the 18th century.

In the hands of Daniel Defoe early in that century, the periodical essay received that particular bent out of which developed the newspaper leader. Towards the middle of the century the periodical essay was revived in *The True Patriot*, *The Rambler*, *The Covent Garden Journal*, *The Adventurer*, *The Idler*, *The Bee*, *The Citizen of the World*, and many more, and found its most notable writers in Henry Fielding, Samuel Johnson, and Oliver Goldsmith. These various works were brought together in *British Essayists*, with prefaces by A. Chalmers, 45 vols., 1817.

With the 19th century the essay branched more definitely into two main kinds, both already, but less distinctly, differentiated, the familiar and the critical essay. Of the writers of the former kind the greatest exemplar is Charles Lamb, whose *Essays of Elia*, 1823, *Last Essays of Elia*, 1833, and uncollected essays may be said to have influenced many of his successors up to the present day. At the same period William Hazlitt was writer of essays of a more robust character, and Leigh Hunt was master of a dainty, graceful essay style, less charmingly individual than that of Lamb. The critical essay received a stimulus from the establishment of the quarterly reviews and the rapid growth of the magazines, Francis Jeffrey, Sydney Smith, and Thomas Babington Macaulay being among its most notable exponents.

Later essayists of note were William Makepeace Thackeray, whose *Roundabout Papers* (1863) takes high rank among familiar essays, James Anthony Froude, and Matthew Arnold; while more recently Robert Louis Stevenson, Austin Dobson, Augustine Birrell, Arthur Christopher Benson, and Edward Verrall Lucas have won applause by their diverse writings in this form. In America Ralph Waldo Emerson has been the most notable essayist, though Edgar Allan Poe, Oliver Wendell Holmes, James Russell Lowell, and more recently Paul Elmer More (*Shelburne Essays*) must be mentioned. *See* English Essays, ed. J. H. Lobban, 1896. **Walter Jerrold**

**Essay on Man**, AN. Moral poem by Alexander Pope. It takes the form of four epistles to Lord Bolingbroke, who is supposed to have suggested the theme, and was published anonymously in 1732-34. Though it has been objected that the author was hampered by the metaphysical nature of his subject, and gives no consistent scheme of beliefs, the Essay will always be remembered for the many terse sentences it has added to the great body of familiar quotations. Among these are: "The proper study of mankind is man," "Hope springs eternal in the human breast," "Die of a rose in aromatic pain," "Pleased with a rattle, tickled with a straw," and a large number of others.

**Essays and Reviews**. Volume by seven writers, six of them clergymen of the Church of England. On its publication in 1860, its rationalistic tendencies aroused a storm of criticism. Two of the clergymen—Williams and Wilson—were suspended by the ecclesiastical courts, but the suspension was revised on appeal to the Privy Council, when, as it was said, Lord Chancellor Westbury "dismissed eternal punishment with costs." The contents of the volume were: *The Education of the World*, Frederick Temple; *Bunsen's Biblical Researches*, Rowland Williams; *On the Study of the Evidences of Christianity*, Baden-Powell; *The National Church*, H. B. Wilson; *The Mosaic Cosmogony*, C. W. Goodwin; *Tendencies of Religious Thought in England, 1688-1750*, Mark Pattison; and *the Interpretation of Scripture*, Benjamin Jowett.

**Essays of Elia**. Volume of familiar papers on various themes by Charles Lamb, published in volume form in 1823 after appearance in *The London Magazine*, and supplemented in 1833 by the *Last Essays of Elia*. These essays, varying from grave to gay, pervaded

with delightful fancy and rich in humour and tenderness, reveal much of the life and character of the author. They not only include the best of Lamb's work, but stand alone and unchallenged as the supreme collection of familiar essays in the English language. *Pron.* Ellia. See Lamb, Charles.

**Esseg.** Variant spelling for the name of the former Hungarian town better known as Eszék (*q.v.*).

**Essen.** Town of Germany. In the Prussian Rhine province, it is 20 m. N.E. of Düsseldorf. Situated near the vast iron and coal deposits of Westphalia, it was here that the Krupp works were established, and to them the town owes its growth, the population having increased

from 9,000 in 1850 to 295,000 in 1910. It is also an important railway centre, and has manufactures of machinery and other iron goods, tobacco, etc.

Although so modern in most respects, Essen is an old place. It grew up around a Benedictine nunnery, and has a notable church, the minster, dating in the main part from the 10th century; it was restored in the 19th. The town was ruled by the abbess, a princess of the empire, who retained her powers until 1803. In 1814 it became part of Prussia. In addition to the minster, which is noteworthy both on account of its design and its decorations, there are several modern churches. Other buildings include a fine town hall, rebuilt in the old style, 1899, the large railway station, theatre, etc. There are several technical schools and hospitals; also parks and other amenities. Essen, together with neighbouring towns, was occupied by the French in Jan., 1923, in their seizure of the Ruhr district, and the Krupp directors imprisoned. See Krupp Works; Ruhr.

**Essen, HANS HENRIK, COUNT** (1755-1824). Swedish soldier and statesman. Born in West Gothland, Sept. 26, 1755, and educated at Upsala, he entered the army. He became a favourite of Gustavus III, whom he accompanied in the war against Russia, 1788-90, and whose assassination he witnessed in 1792. In 1795 he was appointed governor of Stockholm. From 1800 to 1807 he was governor-general of Pomerania and distinguished himself by a stubborn defence of Stralsund against the French. In 1810 he negotiated a peace with France by which Pomerania was restored to Sweden, and in 1811 was pro-

moted field-marshal. In 1813 he commanded the successful expedition against Norway, and was governor there, 1814-16. He died at Uddewalla, June 28, 1824.

**Essen, ADMIRAL VON** (1860-1915). Russian sailor. He commanded the Vladivostok fleet in the Russo-Japanese War, and took a prominent part in the reorganization of the Russian navy. Commander of the Russian Baltic fleet in Aug., 1914, he brought his fleet out from Libau by a daring manoeuvre. He disguised several of his ships as German, and, engaging the German fleet in the Gulf of Finland, Aug. 27, destroyed the German cruiser Magdeburg and damaged another. He died at Reval, May 20, 1915.

**Essence** (Lat. *esse*, to be). The sum of the permanent, constitutive qualities which make an existing thing what it is. The name quintessence (fifth essence) was given by Aristotle to ether, the other four being fire, water, earth, air. Essence is now used to denote the best and purest part of anything. As a theological term, essence or substance (*ousia*) is used of that which is common to the three Persons of the Trinity, in contrast with *hypostasis* (person), which refers to the special characteristics of each Person.

**Essence.** Strong flavouring used in puddings, cakes, and

rennet is made from the stomach of the calf, which poured into milk produces curds. Beef essence or extract is used in the making of gravies, and also as a nourishing food for invalids

**Essendon.** Parish and village of Hertfordshire, England. It stands on the Lea, 3 m. E. of Hatfield. During the Great War it was bombed by German aircraft. Pop. 601.

**Essendon.** Town of Victoria, Australia, in Bourke co. It forms a suburb of Melbourne, from which it is 5 m. distant. Pop. 23,749.

**Essenes.** Ancient Jewish sect. It sought to combine the ascetic practices of the Jewish religion with various Oriental tenets and rites. Probably an offshoot of the older sect of the Chasidim or Assideans, it would appear to have originated in the days of the Macabees (2nd century B.C.). The Essenes believed in one God and in eternal predestination. While maintaining the immortality of the soul, they denied the resurrection of the body; and they held a Greek view of future rewards and punishments. Strongly opposed to an official priesthood, they refused to take part in the Temple sacrifices, but held ceremonial feasts with prayer in their own houses. They led very austere lives, some living in community under a kind of monastic rule, while others lived apart in contemplative solitude. Community of goods was practised, and the time was divided between prayer, study of the sacred books, and agriculture.

Later, becoming tainted with the Gnostic tenets of the essential evil

of matter and the dualistic origin of the universe, they abstained from flesh, wine, and marriage. They paid peculiar reverence to certain angels, and in some cases practised



Admiral von Essen,  
Russian sailor



Essen arms



sweets. It is made by extracting or distilling the volatile oil from plants, seeds, or kernels, such as vanilla, coriander, musk, anise, nutmeg, peppermint, and coffee. Ratafia is prepared from bitter almonds and other kernels and orange peel. Essence of



Essen. Krupp's steel works at the great German manufacturing town. Above, model village in which some of the workmen are housed

a form of sun worship. Strongly opposed by orthodox Jews, though favoured by the Herods, they were, cruelly persecuted by the Romans. They had a settlement near the Dead Sea; Josephus estimated the stricter Essenes of his day at about 4,000. The sect died out before the 3rd century. *Pron. Es-sen-zz. See Jews.*

**ESSENTIAL OR VOLATILE OILS.** Oils representing in the majority of cases the characteristic properties of the plant from which they have been extracted. The term volatile oil refers to the fact that this class of oils can be entirely volatilised without change, whereas the fixed or fatty oils make a permanent greasy mark if placed on a piece of paper. The methods of preparation vary according to the nature of the plant from which the oils are extracted. Delicate perfume oils are produced by an absorption process known as enfleurage.

**Essequibo.** Settlement and river of British Guiana, S. America. The settlement extends to the Venezuelan frontier and borders on the Atlantic Ocean for 120 m. It contains locust trees, iron wood, ebony, greenheart, and other hardwood trees. It was the subject of rival claims, settled by the Arbitration Treaty of Feb. 2, 1897, between Great Britain and Venezuela.

The river rises near the equator, among the mountains on the Brazilian border, and flows N., entering the Atlantic near Georgetown through a long estuary, from 15 m. to 20 m. wide, containing several islands. Its length is about 600 m., only 40 m. being navigable to vessels of deep draught, owing to cataracts; its mouth is impeded by sand bars. The largest river of the colony, it receives important tributaries, e.g. the Rupununi, Masaruni, Cuyuni, and the Pólaro.

**Essex.** Agricultural and maritime county of S.E. England. It is bounded S. by the Thames, E. and S.E. by the North Sea, N. by Suffolk and Cambridgeshire, and W. by Hertfordshire and Middlesex. Its area is 1,530 sq. m. Its 90 m. or more of seaboard, indented by several river estuaries, is marked by low-lying islands: Canvey, Foulness, Wallasea, Mersea, etc. The chief rivers are the Thames, Lea, Stour, Colne, Chelmer, Blackwater, Crouch, and Rod- ing. While the coastal region is flat and marshy, there is comparatively high ground in the N.W.

and centre, the highest points being reached at High Beech, in Epping Forest; Danbury, between Chelmsford and Maldon, and in the Langdon Hills. Harwich is the chief port. Southend-on-Sea, Walton-on-the Naze, Dovercourt, Clacton-on-Sea, and Frinton-on-Sea are popular holiday resorts.

The county produces wheat, barley, and fruit, but apart from brewing (Romford) and engineering (Colchester), the manufacturing industries are to a large extent confined to the metropolitan area, in which is the bulk of the population, that of the agricultural centres having decreased of late years. The Crouch, Blackwater, and Colne have productive oyster beds, the Colchester Oyster Feast, an annual event of some importance, dating from early times. There is a gun-

became the scene of many conflicts between Saxons and Danes. William of Normandy laid a heavy hand upon it. In the 12th century it gave its name to an earldom created by Stephen in favour of Geoffrey de Mandeville. From the 7th until the middle of the 19th century it was ecclesiastically attached to the see of London. It was next linked first to Rochester and then to St. Albans. In 1914 the see of Chelmsford was founded. There are bishops suffragan of Colchester and Barking.

By the earthquake of April 23, 1884, affecting the area between Colchester and the Blackwater, 1,200 houses were damaged.

The county is rich in prehistoric, Roman, Anglo-Saxon, medieval, and monastic remains; has many notable churches and some fine old



Essex. Map of the deeply indented county, showing its relation to the London area

powderfactory at Waltham Abbey, and the Tilbury Docks and Victoria Docks (Plaistow) are on the Thames. Yachts and pleasure boats are built at Burnham-on-Crouch, which is also a yachting centre.

The forest of Essex, known after the early part of the 14th century as the forest of Waltham, has dwindled to what is known as Epping Forest (*q.v.*), a public possession since 1882. There are eight municipal boroughs: Chelmsford, Colchester, Harwich, Maldon, Saffron Walden, Southend, West Ham, and East Ham. The county is served by the G.E., L.T. & S., Mid., and Colne Valley Rlys. Eight members are returned to Parliament.

In the 1st century B.C. Essex was the home of the British tribe of the Trinobantes. Later the kingdom of the East Saxons, it

houses, Audley End among them, while the remains of Norman castles, e.g. Colchester and Hedingham, and the fragment at Hadleigh, bear witness to the Norman occupation. Pop. (1921) 1,468,341.

**LITERARY ASSOCIATIONS.** In Chigwell is the gabled King's Head Inn described as The Maypole in Dickens's novel, *Barnaby Rudge*. The Rose Inn at Peldon and the marshes figure in Baring-Gould's *Mehalah*. Miss Braddon laid the scene of her *Lady Audley's Secret* at Ingatestone. John Locke, the philosopher, spent the last ten years of his life, and was buried, at High Laver. John Ray, the botanist, was born and died at Black Notley; Thomas Tusser, author of *Five Hundred Points of Good Husbandry*, 1573, was born at Rivenhall; Sydney Smith at



Essex arms

marked by low-lying islands: Canvey, Foulness, Wallasea, Mersea, etc. The chief rivers are the Thames, Lea, Stour, Colne, Chelmer, Blackwater, Crouch, and Rod- ing. While the coastal region is flat and marshy, there is comparatively high ground in the N.W.

Woodford; Isaac Taylor at Ongar, his father at Lavenham; and Francis Quarles, the poet, near Romford. Dr. William Harvey was buried at Hempstead, near Saffron Walden.

**Bibliography.** Handbook for Essex, Miller Christy, 1887; Highways, Byways, and Waterways of Essex, C. R. B. Barrett, 1892-93; Memorials of Old Essex, A. C. Kelway, 1908; Romantic Essex, R. A. Beckett, 2nd ed. 1907; Victoria History of the Counties of England, ed. H. A. Doubleday and W. Page, 2 vols., 1903-7; Essex, J. C. Cox, 3rd ed. rev. 1915.

**Essex, EARL OF.** English title now held by the family of Capell. There were earls of Essex soon after



Walter Devereux,  
1st Earl of Essex  
From a portrait in the  
collection of Baron  
Bagoi

the Norman Conquest, and Geoffrey de Mandeville was one of the first. His sons followed him, after which the earldom came to the Bohuns. This family became extinct in 1373, when the title passed to Thomas of Woodstock, duke of Gloucester, who had married one of the heiresses of the Bohuns. Henry Bourchier, a grandson of Gloucester, was the next earl, but his family died out in 1540. Thomas Cromwell was made earl of Essex in 1540, and William Parr, marquess of Northampton, in 1543, but both lost the title when they lost their lives.

The family of Devereux, to which the most famous earls of Essex belonged, was related to the Bourchiers, and probably for this reason Walter Devereux (1541-76) was made earl of Essex in 1572. He married a daughter of Sir Francis Knollys, and spent three years in unsuccessful efforts to colonise Ulster, whither he went with a small army in 1573. He was succeeded by his son, the favourite of Queen Elizabeth, and with the death of the latter's son Robert, in 1646, the title became extinct.

In 1661 Arthur Capell was made earl of Essex. He was succeeded in 1683 by his son Algernon, and the title is still held by his descendants. His seat is Cassiobury Park (q.v.). The earl's eldest son is known as Viscount Malden. In 1916 Algernon (b. 1884) became the 8th earl.

**Essex, ROBERT DEVEREUX, 2ND EARL OF (1566-1601).** English soldier and courtier. Eldest son of the 1st earl, he was born at Netherwood, Herefordshire, Nov. 19, 1566, educated at Trinity College,

Cambridge, introduced at court, 1577, and was general of the horse under his stepfather in the Netherlands, 1585-86, being made a knight for gallantry at Zutphen. He inherited Leicester's court feud with the party in which the Cecils and Raleigh were prominent, but became a favourite of the queen, though his lack of self-control led to frequent quarrels, and his marriage with the widow of Sir Philip Sidney especially angered her.



Robert Devereux,  
2nd Earl of Essex  
After Hilliard

He took part in Drake's expedition to Portugal, 1589, commanded an expedition to Normandy, 1591, secured the conviction of Roderigo Lopez for conspiracy against the queen's life, 1594, distinguished himself at the capture of Cadiz, 1596, lost favour by the failure of the Islands, or Cadiz Voyage, 1597, and was master of ordnance, earl marshal, informal foreign secretary to the queen, and chancellor of Cambridge. In 1599 he was appointed governor-general of Ireland, and, returning without leave, from his attempt to suppress the rebellion of O'Neil, earl of Tyrone, with whom he was accused of making a dishonourable treaty, he was dismissed from office and imprisoned from Oct., 1599, to Aug., 1600.

Thwarted in his efforts to regain influence at court, and broken in health, he was implicated with Southampton and others in an attempt to secure the dismissal of the queen's advisers. He attempted a rising in London, was arraigned, and beheaded Feb. 25, 1601. Bacon, whom he had befriended, appeared against him on his return from Ireland, and with Raleigh was largely responsible for carrying out the death sentence, to which Elizabeth reluctantly consented. The story that the queen gave Essex a ring, the return of which would have ensured his pardon, is generally discredited, though what was described as the identical ring was sold at Christie's, May 19, 1911, for £3,412. Essex was fearless but headstrong, reckless but generous, and a popular favourite. He was a writer of sonnets and masques.

**Bibliography.** Lives and Letters of the Devereux, Earls of Essex, W. B. Devereux, 1853; Bacon and Essex, E. A. Abbott, 1877; With Essex in Ireland, E. Lawless, 1890; Hatfield MSS.; correspondence in Manchester Guardian, Oct., 1907.

**Essex, ROBERT DEVEREUX, 3RD EARL OF (1591-1646).** English soldier. Son of the favourite of Queen Elizabeth, he was restored in 1604 to the title his father had lost, James I being then on the throne. He began life in the king's circle, being chosen as one of the companions of Henry, prince of Wales. In 1620 Essex went with a force to recover the Palatinate for the elector Frederick, and in 1625 with the fleet that went to capture Cadiz. In 1639 he held a command in the army sent by Charles I against the Scots in the first Bishops' War, after which there was an estrangement between him and the king. On the outbreak of the Civil War Essex took the side of the parliamentarians, and was appointed general of their forces.



Robert Devereux,  
3rd Earl of Essex  
After Walker

The earl led the army at Edgehill, relieved Gloucester and fought the first battle of Newbury. He proved his incapacity when, after leading his army into Cornwall, he left it to surrender at Lostwithiel, himself escaping by boat. He resigned his position when the self-denying ordinance was passed in 1645, and died Sept. 14, 1646.

**Essex Regiment.** Regiment of the British army. Formerly the 44th and 56th Foot, raised in 1741 and 1745 respectively, these troops took part in the siege of Gibraltar (1779-83), where their services are commemorated by the Castle and Key and the word Gibraltar on their colours. They fought in the West Indies and Egypt against France, before taking part in the Peninsular War; there the regiment won the nickname of the "little fighting fours." They were at Waterloo, and in the retreat from Kabul (1842), the Crimean War, the Indian Mutiny, the China War (1860), and the Nile Campaign (1884-85). During the S. African War they took part in the battle of Paardeberg and the relief of Kimberley. In the Great War the 2nd Essex were in the retreat from Mons. In the German counter-offensive at Cambrai, 1917, a company of the 13th Essex made a gallant stand at Moeuvres. The regimental depot is at Warley.



Essex Regiment  
badge



**Essexites.** Crystalline granular rocks named after Essex co., Mass., where they were first found. They belong to the gabbro group and usually contain felspar (labradorite), olivine, augite, hornblende, and biotite.

**Es Sinn, ATTACK ON.** British operations, Jan.-May, 1916. After his retreat from Ctesiphon, Mesopotamia, Townshend was closely invested by the Turks at Kut-el-Amara, Dec. 3, 1915, and a relief force was organized under Aylmer. To reach Kut the Indo-British forces had to storm several positions on the Tigris. The British base camp was Imam Ali Gherbi; and the final objective was the strong entrenched position of Es Sinn, 7 m. E. of Kut.

On Jan. 7-8, 1916, Aylmer forced the Turks from Sheikh Saad, and on Jan. 13-15 they were driven from the Wadi positions, about 25 m. from Kut. Delayed by adverse weather conditions Aylmer was unable to make any considerable movement until March 8, when he attempted a flanking movement by attacking the Dujailler redoubt at the S. end of the Es Sinn position. On March 12, Gorringer, who had succeeded to the command of the relief force, planned an attack on the left bank of the Tigris. On April 4 the Hannah position was carried, by which time the Felahieh position had been won.

Townshend was in great need of food and supplies, and great efforts were made by the relief force. On April 17 the British achieved a small success at Beit Aiessa, but the Es Sinn positions could neither be turned nor carried. On April 24 a desperate effort was made to break the blockade of Kut, and get supplies to Townshend. The steamer Julnar was dispatched at night up the Tigris with 270 tons of supplies under Lt. H. O. B. Firman and Lt.-Com. C. H. Cowley. It reached Magasis, behind Es Sinn, where it was captured by the Turks. Townshend surrendered on April 25. The Turks failed to follow up their success. Instead of attacking the exhausted Indo-British army they retired from their advanced position by Es Sinn on May 19. The British followed up and cleared most of the right bank of the Tigris, but they were too exhausted to carry on a vigorous offensive, and the situation developed into a stalemate until autumn. See Aylmer; Kut; Mesopotamia, Conquest of; consult also My Campaign in Mesopotamia, C. V. F. Townshend, 1920.

**Essipoff, ANNETTE** (1851-1914). Russian pianist. Born at St. Petersburg, Feb. 1, 1851, she

studied at the Conservatoire under Theodor Leschetitzky, whom she married in 1880. For many years she was a teacher at the Conservatoire. She played with great success in most of the chief cities of Europe and America. She died in Dec., 1914.

**Essling.** Village of Lower Austria. It stands on the Danube, 7 m. E. of Vienna. Between this village and the neighbouring one of Aspern a battle was fought between the French and Austrians, May 21-22, 1809. See Aspern, Battle of.

**Esslingen.** Town of Germany, in Württemberg. It stands on the Neckar, 7 m. E.S.E. of Stuttgart. Its chief interest is historical. The old town, around which are the modern suburbs, is still girt with its walls and towers, while above is the ruined castle. The public buildings include the church of S. Dionysius, dating in part from the 11th century; the 14th century church of Our Lady, a Gothic building restored in the 19th century, and containing some beautiful stained glass and a fine tower;



**Esslingen.** The historical town of Württemberg, showing, on the left, the Gothic church of Our Lady

the 13th century Gothic church of S. Paul; a hospital, and several schools. There are two town halls: the older one, dating from 1430, is now a school, and has a wonderful clock; the newer one was formerly a palace. The industries include large engineering works, railway shops, electrical and lithographic works, also the making of cloth and a trade in wine. Esslingen, a town since 886, was a free city from 1209 until 1802, when it was taken into Württemberg. Pop. 32,364.

**Est, CANAL DE L'.** Canal of N.E. France. It extends from the Meuse, near Givet in Ardennes, to Porte-sur-Saône in Haute-Saône, and has connexion with the Marne and Rhône Canal at Void. Portions of the Meuse and Moselle are included in the canal system, which has a length of 286 m.

**Estaing, CHARLES HECTOR THÉODAT, COMTE D' (1729-94).** French sailor. Born in Auvergne, he entered the army and attained the rank of brigadier. After serving in India, he returned to France and entered the navy, being promoted vice-admiral in 1777. The following year he fought against Britain, and in 1779 took St. Vincent and Grenada. After his return to France, he was colonel of the national guard at Versailles in 1789, but his royalist tendencies aroused suspicion. He gave evidence at the trial of Marie Antoinette in 1793, but was subsequently accused of being a royalist, and was guillotined April 28, 1794.

**Estaires.** Town of France, in the dept. of Nord. It is on the river Lys, 13 m. W. of Lille, and was prominent in the Great War. The Allies occupied it early in Oct., 1914, and it continued in their possession until 1918. In the German offensive against the Channel Ports, April, 1918, it was the scene of spirited fighting. At the Estaires drawbridge the British held the enemy until the great steel and concrete structure was blown up. The town was held by the British throughout the day and night of April 9-10. On April 11 men of the 50th division were engaged in street fighting here. Occupied by the Germans, April 11, it was recovered by the Allies early in Sept. See Ypres, Battles of.

**Estate.** Originally a condition, or a modern word state. It is chiefly used, however, for landed and other property, and all property is by English law classed as either real estate or personal estate. By the word alone is meant landed property, generally a considerable amount under a single ownership and all contiguous. An estate may be of various kinds, freehold, leasehold, or copyhold. See Land Laws; Real Property.

**Estate Agent.** One who acts for another in the management or sale of landed or house property. He lets and collects the rents of estates, farms, houses, cottages, etc.; and generally represents the landlord in dealing with tenants. He should have a knowledge of agriculture, bookkeeping, surveying, valuing, forestry, drainage, building

construction and repair, and the laws concerning the relations of landlord and tenant. See Surveyor.

**Estate Duties.** Name given in the United Kingdom to the duties paid on the estates of deceased persons. They date from 1894, before which time there were death duties of various kinds, including legacy, probate, and succession duties. In 1894 two new principles were introduced. Real property, hitherto exempt from charges of this kind, was made to pay at the same rate as personal property, and the duties were levied on a graduated scale. The first scale was from 1 p.c. on small estates to 8 p.c. on those over £1,000,000 in value. The duties on the larger estates were increased several times, these rising to 10, 15, and then to 20 p.c., and in 1919 there was another increase on the latter, the scale rising to 40 p.c. on estates of £2,000,000 and over. In 1917-18 the receipts from the estate duty were £25,742,554.

Gifts made within three years of death, unless part of the deceased's normal expenditure, are charged with duty. Payment may be made in real or leasehold property; also in war loan, which is taken at its nominal value. Estates under £500 may pay an inclusive fee of 30s. or 50s., which covers all duties. Interest on the duty on personal property is charged at the rate of 4 p.c., reckoned from the day of death. On real estate this can be paid by instalments, on which interest is only charged after twelve months. See *The Law and Practice of the Estate Duty*, A. W. Soward, 5th ed. 1914.

**Estates.** Word used for "an organized collection, made by representation or otherwise, of the several orders, states, or conditions of men who are recognized as possessing political power." Its interest is now solely historical, although we still speak of the estates of the realm. In France, Germany, and some other European countries, the same idea is translated by the word *states*, and so we have the *states-general* of France and the Dutch Republic.

The idea of estates began about the 13th century with the growth of the representative system, and we soon find them in Spain and France, as well as in England and Scotland. In France the various provinces, e.g. Brittany and Languedoc, had their local estates, and in Spain the various kingdoms had theirs. The German countries had also their estates who met in a *landtag* or *diet*. It is usual to assume the number of estates as three, but this is purely accidental. In Sweden

and Aragon there were four estates. In England the merchants and lawyers might easily have formed a separate estate, but they did not, and so we have the three estates of lords spiritual, lords temporal, and commons, sitting, however, in two houses. In Scotland the lesser barons formed a separate estate, not sitting, as they did in England, with the representatives of the towns. The sovereign is sometimes referred to as an estate of the realm, and the press is known, a tribute to its power, as the fourth estate, a phrase said to be due to Burke. See *Diet*; *Landtag*; *Parliament*; *Representation*.

**Estcourt.** Town of Natal. It stands at an elevation of 3,830 ft., on the rly. from Pietermaritzburg to Ladysmith, 76 m. N.W. of the former. It was the scene of important operations during the S. African War. At Weenen, 28 m. E., parties of Boers were massacred by the Zulus in 1838. Pop. 1,295.

**Este** (anc. *Ateste*). City of Italy, in the prov. of Padua. It stands on the slopes of the Euganean Hills, 20 m. by rly. S.W. of Padua. It is enclosed by medieval walls, has a ruined castle, a cathedral, and two other churches, one with a leaning bell-tower. The National Museum is rich in prehistoric, lacustrine, and sepulchral relics, besides Greco-Roman antiquities. The manufactures include pottery, ropes, and iron goods. A Roman

Hanoverian sovereigns of Great Britain are descended.

From the latter came the

Italian family which held the lordships of Ferrara, Modena, and Reggio, the emperor Frederick III making Barco d'Este (d. 1471) duke of Modena and Reggio in



Rinaldo, Cardinal d'Este

From an old print

1452, while Pope Paul II created him duke of Ferrara in 1471. His brother, Ercole I (1431-1505), was father of Beatrice (1475-97), duchess of Milan, one of the most beautiful and cultured women of the Italian renaissance.

Alfonso I (1486-1534), who married Lucrezia Borgia as his second wife, he being her third husband, was a statesman and a soldier. His son, Cardinal Ippolito (1509-72), built the magnificent Villa d'Este at Tivoli. Alfonso II (1533-97) kept a luxurious court, where he detained the poet Tasso, who was in love with his sister Eleanor. Alfonso IV (1634-62) was father of Maria Beatrice, queen of James II of England. The Italian branch of the family ended with Ercole III (1727-1803), who was dispossessed of the duchy of Modena by the treaty of Campoformio in 1797, and whose only daughter, Maria Beatrice, married Archduke Ferdinand, third son of Francis I of Austria. His son Francis IV (1779-1846) was made duke of Modena by the congress of Vienna in 1814, but his son Francis V (1819-75) was dispossessed by the incorporation of the duchy in the kingdom of Italy in 1859. See Modena. Pron. Es-ty.



Este. The Villa d'Este at Tivoli, near Rome, built by Cardinal Ippolito d'Este in 1549

town, it became the seat of the Este family in the 10th century, and in 1405 it surrendered to Venice. Pop. 11,704.

**Este.** Name of a noble Italian family founded by Oberto II (c. 1015), margrave of Casalmaggiore. His grandson, Azzo II, became duke of Milan, and his sons, Guelf and Fulco, founded the German and Italian branches of the family respectively. From the former the

**Ester.** Substance formed by the union of alcohols and acids with the elimination of water. Gmelin first used the term *ester* to distinguish this class of compounds from simple and mixed "ethers." An ether is an oxide of the alcohol radical analogous to metallic oxides, whereas in esters both an alcohol radical and an acid radical are present. Esters are prepared (1) by the direct action of an acid upon

an alcohol, (2) by the action of an acid chloride or the anhydride of an acid upon an alcohol, or (3) by treating the salt of an acid with an alkyl halide, e.g. methyl acetate may be prepared by treating silver acetate with methyl iodide.

**Esterhazy, MARIE CHARLES FERDINAND WALZIN, COUNT (b. 1847).** French soldier.



Count Esterhazy,  
French soldier

He served in the regiment of Papal Zouaves, became a major in the French army, and accused Captain Dreyfus of writing the famous *bordereau*, or document, containing military secrets, said to have been communicated to the German military authorities. The opinion grew that Esterhazy had himself forged the *bordereau* in Dreyfus's handwriting, and that he had supplied information to Germany. He was compelled to leave France when the truth became known, and later confessed the forgery. See Dreyfus Case.

**Esterházy de Galantha.** Family of Hungarian noblemen. Dating back to the early 13th century, in the 17th they became princes of the German empire. They were great supporters of the house of Hapsburg and have included several notable men. Among these were Paul IV (1635-1713), a great general in the wars against the Turks; Nikolaus Joseph (1714-90), general, diplomatist, and patron of art, literature, and music; and Nikolaus IV (1765-1833), founder of a famous collection of pictures at Vienna, who declined Napoleon's offer of the crown of Hungary, and supported the national Hungarian movement.

**Esther, BOOK OF.** O.T. book so named after the chief character in the story. When Vashti, the consort of the Persian king Ahashverôsh (Xerxes), was deposed, Esther, the adopted daughter of Mordecai, a Jewish exile, was chosen in her place. She was thus enabled to frustrate the plots of Haman (*q.v.*), a powerful enemy of her people. Haman had cast lots (*purim*) to destroy the Jews, and the real purpose of the book seems to be to explain the origin of the Jewish festival Purim (called in 2 Maccabees xv, 36, the Day of Mordecai). The book of Esther would seem to have been written between 300 B.C. and the Christian era. See Commentary by T. Witton Davies in the Century Bible.

**Esthonia.** Republic of N.W. Europe, formerly part of the Russian Empire. It is bounded N. by the Gulf of Finland, E. by Russia, S. by Latvia and the Gulf of Riga, and W. by the Baltic. It comprises the N. part of Livonia, the former govts. of Estland and the N.W. part of Pskoff. Its area is about 23,160 sq. m., and in 1920 its estimated pop. was 1,800,000. Except in the S.E., which is hilly, the mainland lies low, it is intersected by numerous rivers and streams, and much of it is swampy. There are many lakes, and about half of Lake Peipus lies within it. About 30 p.c. is forest. The climate is rather hot in the summer and cold in the winter. Dago, Oesel (Ezel), and other islands belong to it.

The chief occupation of the people is agriculture. This is conducted scientifically, with the result that good crops, particularly of flax, are raised from a naturally poor soil, and there is a flourishing livestock industry. Oil-shale in rich quality is plentiful. Manufactures include iron, steel, mach-

were few class distinctions among the Esthonians proper.

The early history of the country is obscure, but early in the 13th century it was conquered by Danes and Germans. The Danes founded Reval in 1219, and later divided the land between themselves and the Germans, finally selling their part of it in 1346 to the Teutonic Knights who joined it up with Livonia. After the dissolution of the Teutonic Order in 1560, N. Esthonia passed to Sweden. S. Esthonia remained under Poland till 1629, when the whole of Esthonia became a Swedish province with Livonia, which was ceded to Russia in 1721. German influence was always strong owing to the presence of the Baltic Barons, the descendants of the Teutonic Knights, and of numerous German settlers (Balts), who called the country Estland or Esthland and its natives the Ests. Only after the Russian revolution and the Esthonian war of liberation was this German influence crushed.

In religion the Esthonians are Lutherans, except about 15 p.c.



Esthonia. Map of the Baltic republic, which, before the Great War, was part of the Russian Empire

inery, cotton, paper, wood pulp, and spirits. Esthonia carries on a large transit trade, the seaport of which is Reval, the capital, connected by railway with Petrograd. Baltic Port and Pernau are other shipping centres. Other towns of note are Narva and Dorpat, or Yuriev. Arensburg and Hapsal are famed for their curative mud baths.

The Esthonians are of Finnish origin, but about 10 p.c. of the pop. are Russians, Germans, Swedes, etc. The pure Esthonians have a language and a culture of their own. Before the Great War the upper classes consisted chiefly of Russian officials and Germans, and there

who belong to the Greek Orthodox Church, forming an independent apostolic church of Esthonia. The standard of education is very high, there being hardly any illiterates. Secondary education is provided by numerous grammar schools and lyceums. Dorpat University, established by Gustavus Adolphus in 1632, was reopened on Oct. 6, 1919, as an Esthonian university, with faculties of theology, mathematics, physics, history, law, agriculture, etc.

All instruction is given in Esthonian; until recently Russian and German were compulsory. There is a polytechnic school in

Reval and technical schools in various parts of the country. Esthonia is rich in folklore, the chief records of which are *Monumenta Estoniae Antiquae*, and the MS. collection of Jacob Hurt, containing songs, tales, proverbs, and other folklore items. After F. R. Kreutzwald published the national epic *Kalevipoeg* in 1861, a new Esthonian literature developed in the 19th century, among the best known writers being Otto Masing, Lydia Koldula, Mihkel Weski, and Johan Liiv.

**ESTHONIA AND THE WAR.** By decree of the Russian provisional government on April 12, 1917, the prov. of Esthonia was united with the N. part of the prov. of Livonia, which was inhabited by Esthonians, and formed into a new autonomous prov. called Esthonia, under a national council or diet. This council was elected by universal suffrage, May-June, 1917, and met at Reval, June 14, when a national government was set up.

#### Declaration of Independence

After the seizure of the supreme power in Russia by Lenin, Esthonia, like Finland, decided to become independent. She was about to hold a constituent assembly when the Bolsheviks intervened, and summarily dissolved the national council. The Esthonian Government, under Paets, still remained in being, though precariously, and on Feb. 24, 1918, proclaimed Esthonia an independent republic. During the Brest-Litovsk negotiations, the Germans, to compel Lenin to come to terms, took Reval on Feb. 25, and, marching through Esthonia and Livonia, captured Dvinsk and Pskoff.

By the Brest-Litovsk treaty the Bolsheviks undertook to evacuate those territories, which were to be policed by the Germans until the state organization of both provinces was restored. As this would have virtually meant the complete Germanisation of these regions, the people, 90 p.c. of whom were pure Esthonians, made emphatic protests to the Allies, and on May 3, 1918, Great Britain, and later France and Italy, recognized the national council as the *de facto* government of Esthonia.

But the Germans remained masters of the country, and it was not till Nov. 11 that the Esthonians recovered supreme power. On Nov. 19 they concluded an agreement with Germany, who undertook to evacuate Esthonia at once, but did not do so, preferring to play into the hands of the Bolsheviks, then beginning an invasion which carried them to within 15 m. of Reval. Finland then came to the aid of Esthonia with 5,000 rifles,

some guns, and 10,000,000 Finnish marks. On Dec. 12 a British fleet, under Admiral Sinclair, entered Reval with arms and munitions, and on Dec. 26 captured two Bolshevik destroyers, which were handed over to the Esthonians.

Meanwhile Esthonia had organized her army under General Laidoner, a former Russian staff officer, and by Feb. 24, 1919, her soil was free of the enemy.

A general election took place in Esthonia, April 5-7, the constituent assembly opened on April 23, and a democratic government was formed, with O. Strandmann as prime minister; he remained in power until Nov., 1919, when a new coalition government, under J. Toenisson, was established. The chief work of the assembly lay in agrarian reform—the nationalisation of the estates of the Baltic barons, and the division of the land among the people, but also a constitution was elaborated, and several bills were passed.

After five years of almost continuous fighting Esthonia longed for peace, and as Koltchak, Denikin, and Yudenitch were averse from recognizing its independence, the new state accepted the proposals for a peace conference made by the Soviet Government through Tchitcherin on Aug. 31. This took place at Pskoff, Sept. 19, but the Esthonian delegates made it a condition that Bolshevik peace proposals were to be submitted to all the Baltic States together, to which the Soviet representatives agreed.

#### Conclusion of Peace

Various conferences were held by Esthonia, Latvia, and Lithuania, and it was decided to hold a conference with the Soviet Government in Oct. at Dorpat. But in that month Yudenitch, supported by the British and Esthonian fleets, advanced on Petrograd, and Bermondit, ostensibly in the anti-Bolshevik interest, began operations in Latvia; therefore the peace conference was not held. Yudenitch's attempt failed, and the Reds heavily attacked Narva in Nov.-Dec., but were checked by the Esthonians.

Peace negotiations were resumed, an armistice was signed on Dec. 31, and peace was finally made Feb. 2, 1920. By the peace treaty the full independence of Esthonia was recognized by the Soviet Government, which promised to pay to her 15,000,000 roubles in gold, and also granted preferential rights for building a rly. from Reval to Moscow.

**Bibliography.** L'Allemagne et la Baltikum, G. Gaillard, 1919; L'Esthonie, les Esthoniens, et la question Esthonienne, M. Martina, 1920.

**Estimate** (Lat. *aestimare*, to value). Generally, a statement of the probable cost of any contemplated undertaking. More particularly, it is a statement furnished by builders, contractors and others, naming the sum for which they are prepared to execute a specified piece of work.

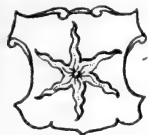
In the Imperial Parliament the consideration of the estimates of national expenditure is an important part of the financial work of the year. The various departments send to the treasury before Dec. 1 particulars of the amount they are likely to want for the year beginning April 1 following. These are examined and sometimes reduced by the treasury officials, and in their amended form are presented to the House of Commons in three groups: civil service, navy, army.

#### Civil Service Estimates

The civil service estimates proper are divided into eight classes: (1) public works and buildings; (2) salaries and expenses of civil departments; (3) law and justice; (4) education, science, and art; (5) foreign and colonial services; (6) non-effective and charitable services; (7) miscellaneous; (8) insurance and labour exchanges; and the estimates of the revenue departments into three: (1) customs and excise; (2) inland revenue; (3) post office. The Commons consider the estimates early in the year, as they must be passed before March 31, or the money cannot be legally spent. This difficulty, however, is usually met by voting a sum on account.

The twenty days allowed for their discussion afford a recognized opportunity for criticising ministers and officials and the work of the various departments. The procedure is for a member to move that the vote in question, e.g. for the salaries of consuls or the provision of rifles, be reduced by a certain amount. In practice, however, a few, often trivial, points are picked out for debate, and the bulk of the estimates are passed *en bloc* and without a word on the last of the allotted days. If the amounts provided by the estimates are insufficient, which, apart from ordinary miscalculations or changes, may be due to a sudden emergency, e.g. an outbreak of disease, supplementary estimates are presented later. In 1912 a select committee was appointed to examine and report upon the estimates, and this course has since been followed each year. In 1918 another select committee made recommendations with a view to securing for the House more control over them. See National Finance.

**Estoile** (old Fr., star). In heraldry, a star, usually represented as having wavy rays. If there are



six rays or more, only the alternate rays are wavy. An estoile with a number of long rays springing from it at an angle, or with a long tail, is called a comet. See Muller.

**Eston.** Urban dist. and town of N. Riding, Yorkshire, England. It is 5 m. S.E. of Middlesbrough, on the N.E.R. There are important blast furnaces, iron-foundries, and saw-mills, and steel rails are largely made. Ironstone is quarried extensively in the Cleveland Hills. Pop. 12,026.

**Estoppel** (old Fr. *estoper*, late Lat. *stuppere*, to stuff with tow, *stuppa*). Doctrine of English law. Broadly, it means that in certain circumstances a party will not be allowed to show the truth in his own favour, when he has, by some act or deed or negligence, led the other party to believe that something else is the truth. Estoppel is (1) by deed; (2) *in pais*, or by act; (3) by negligence. (1) If A makes a deed of conveyance of Whiteacre to B on March 1, reciting in it that he (A) is the owner, and in fact he is not, but on some subsequent day he becomes the owner, the estate at once passes to B, because A will not be allowed to come and say that on March 1 he had no right to convey. Generally speaking, every statement made by a man in a deed estops him from denying the truth of it. (2) If A does an act or makes a statement which causes B to alter his position, A is not allowed afterwards to aver against B anything to contradict the act or statement. Thus, if A takes lease of a house from B, he cannot afterwards say that B is not the owner thereof and refuse to pay his rent. (3) If A by his negligence causes B to alter his position, he is not allowed to dispute the correctness of B's action so as to take advantage of his own negligence.

**Estournelles de Constant,** PAUL HENRI BENJAMIN, BARON D' (b. 1852). French publicist. Entering the diplomatic service, he became chargé d'affaires in Montenegro, and was attached to the embassy in London, 1890-95. In



Baron d'Estournelles de Constant, French publicist

1904 he was elected a senator, and as a member of the Hague Court exerted his influence for peace. He received the Nobel Peace prize in 1909. He wrote much for French, English, and American reviews.

**Estovers** or **BOTES.** Certain furnishings of wood that a tenant is allowed to cut and use for the purpose of his holding. They include *firebote*, or wood for firing; *ploughbote*, to mend his plough; *housebote*, to repair his house; and *hedgebote*, to maintain his fences. Estovers are usually, if not always, enforceable by the custom of a manor, and are rights indefeasibly attached to the freeholds and copyholds of that manor; that is to say, they are not personal rights, but must be claimed in the character of tenant of the manor. Estovers is old Fr., necessities; *bote* is mid. Eng., advantage. See Lopping.

**Estray** (old Fr. *estraier*, to stray, wander from the street, Lat. *strata*). Term used in law for a strayed animal. A quaint old law of England says that if valuable tame animals are found wandering at large they are to belong to the sovereign. But in most cases the sovereign long ago granted the right in them to the lord of the manor where they might be found. They must be "proclaimed" in the nearest church and two market towns, and, if not claimed in a year and a day, are irredeemably lost to the owner. See Pound.

**Estrat** (old Fr. *estrait*, extract). Term used in English law, meaning to forfeit something, generally a sum of money, by way of enforcing an obligation to the crown. It usually occurs in the case of recognizances, where a person has agreed to do or not to do something in face of a court under penalty of paying so much if he does not fulfil the obligation. Thus, A. B. will enter into a recognizance to keep the peace for six months under penalty of £50. If he breaks the peace within that time his recognizance may be estreated, and the like happens if X. Y. goes bail in £50 that A. B. should appear and stand his trial. The bail will be estreated if A. B. does not duly appear. Estrat is enforced by levying a distress upon the property of the person liable. The original meaning of the word is a copy or extract of an original record or document.

**Estrées.** Name of four villages of France: (1) in dept. of Nord, slightly S. of Douai; (2) in dept. of Aisne, slightly E. of St. Quentin Canal, N. of Bellenglise. On Oct. 1, 1918, the British stormed the village and its defences in the great offensive N. of St. Quentin; (3) in

dept. of Somme, on the Amiens-St. Quentin road, prominent in the battles of the Somme, 1916-18; (4) in Oise dept., known as Estrées-St. Denis, W. of Compiègne. See Cambrai, Second Battle of; Hindenburg Line; Somme, Battles of the.

**Estrées, GABRIELLE D' (1573-99).** Mistress of Henry IV of France. Daughter of Marquis



Gabrielle d'Estrées

From an old portrait

Antoine d'Estrées, she met Henry at Couvres in 1590. Impressed by her beauty, the king caused her to be divorced from her husband, Nicholas d'Amerval, Sieur de Liancourt, and in 1592 he betrothed her to Paris, where she bore him several children. He created her marquise de Monceaux and duchesse de Beaufort, and was so infatuated that had she not died suddenly at Paris, April 4, 1599, he would have divorced Marguerite de Valois and made her his queen. See Life (in French), A. Desclozeaux, 1889. Pron. Estray.

**Estrella, SERRA DA.** Range of mountains of Portugal, in the prov. of Beira. Lying midway between the Tagus and the Douro rivers, virtually forming the watershed between the Mondego and the Zézere, the highest point is Malhão, 6,540 ft. A beautiful verdure-clad range, it commands extensive views, and runs, from S.W. to N.E., a distance of 75 m.

**Estremadura.** Province of W. Portugal, S. of Beira. It is divided into the districts of Leiria, Santarém, and Lisbon. Its otherwise regular coast-line is broken by the estuaries of the Tagus and the Sado rivers. N. of the Tagus it is hilly; to the S. it is low-lying with marshy land. Some parts are fertile, others barren; barely half is under cultivation. In the Tagus valley wine, oil, and fruit are produced. The manufactures are of little importance, but cork, salt, soda, and fish are exported, and herbs are grown on the sandy plains. Area, 6,937 sq. m. Pop. 1,438,726.

**Estremadura.** Former territorial division of S.W. Spain, co-extensive with the present provinces of Cáceres and Badajoz. An arid plateau, denuded of its forests, lacking water, and depopulated by emigration to America, it is largely a barren, heath-covered waste or undulating pastureland, feeding huge droves of migratory sheep and pigs. Wine, oil, figs, and almonds are produced, but agriculture is hindered by drought



and locusts. Minerals exist, but mining is neglected. Area, 16,000 sq. m. Pop. 1,034,799.

**Estrup**, JACOB BRÖNNUM SCAVENIUS (1825-1913). Danish statesman. In 1864 he became a member of the Landsthing. From 1865-69 he was minister of the interior, and took part in the revision of the constitution and improved the country's rly. system. In 1875 he became minister of finance and president of the council, and, supporting the king in his conflict with the democratic parties, made use of the royal prerogative in issuing acts, and even governed for 10 years by provisional budgets. He resigned in 1894, and his retirement indicated the change to more democratic rule in Denmark. In 1902 he opposed the sale of the Danish West Indies to the U.S.A. He died Dec. 26, 1913.

**Estuarine Deposits.** Accumulations of sediment transported by a river and laid down near its mouth. They depend on grade of sediment, strength of current, and depth of river. Frequently the dropping of sediment, caused by the checking of the stream by the sea, forms a barrier across the mouth, and lagoon conditions are established inside. In former geological periods such conditions have resulted in deposits marked by comparatively limited extent, usually sandy facies, and accompanied by characteristic vegetation and animal remains (shellfish, etc.), e.g. inferior oolite beds of Yorkshire.

**Estuary** (Lat. *aestus*, tide). Arm of the sea into which a river flows. As a rule an estuary consists of the drowned lower portion of a valley. Where the land slopes gently down below sea level and the shores are wider apart nearer the open sea the estuary is a *ria*, or drowned river valley; the indentations of S.W. Ireland belong to this type. The indentations of the Norwegian coast, the fiords, are steep-sided, deep estuaries which are shallow near the entrance; they are due in part to glacier action. On some coasts estuaries arise from the emergence above the water of sand banks, which transform a bay into a lagoon filled with river water. Such estuaries are the *haffs* of the S. shores of the Baltic. British estuaries are notably more extensive than the rivers which now flow into them, thus inconformity indicates submergence. Estuaries tend to be filled up with alluvium, the Dee estuary being thus almost useless for navigation. See Coast; River.

**Eszék**, ÓSIEKORÉSSÉK. Town in Yugo-Slavia, formerly in Hungary. It is situated on the right bank of

the Drave, 125 m. by rly. N.W. of Belgrade, and is the first important town above the confluence with the Danube. Here one rly. crosses the Drave from the N. and four lines radiate S. of the river to various centres in Slavonia. As the capital of Slavonia, it is a busy trading centre and is strongly fortified. Silk factories and flour mills derive their motive power from the river. Pop. 31,400, one-third Croats, nearly one-third Germans; three-quarters Roman Catholics.

**Esztergom** OR GRAN. City of Hungary, on the right bank of the Danube, 38 m. by rly. N.W. of Budapest. It is the eccles. capital, and guards the river bridge for road traffic from Budapest to the Little Alföld. The cathedral is said to be the finest building of its kind in Hungary. Agriculture and the culture of the vine are carried on, and the town is noted for its thermal springs. Below the town the Danube flows in a contracted valley and makes its great bend to the S. Pop. 17,900, nearly all Magyar Roman Catholics.

**Etah.** District and town in India, in the Agra Division of the United Provinces. The area of the district is 1,729 sq.m. Sixty p.c. of the land is cultivated, among the chief crops being wheat, barley, maize, grain, cotton, sugar-cane, and indigo. The headquarters of the district are situated in the town of Etah, which dates from the 14th century.

**Etah.** Settlement on the coast of Greenland. In Prudhoe Land on Smith Sound, it is inhabited by Eskimos.

**Étampes.** Town of France, in the dept. of Seine-et-Oise. It stands on the Juine, 38 m. by rly. S.S.W. of Paris, and has a number of small industries, including flour-milling, but is chiefly a market for agricultural produce. In the Middle Ages it was comparatively more important than it is to-day, and it retains some of its old buildings. These include the churches of Notre Dame, S. Basil, S. Gilles, and S. Martin; and the 16th century hôtel de ville. Francis I made one of his mistresses duchess of Étampes. The house, once occupied by Diana of Poitiers, is now used for public purposes. Pop. 9,454.

**Étang** (Lat. *stagnum*). French word for a shallow sheet of water somewhat similar to a lagoon.

Such are frequent in the S.W. part of France, bordering the Bay of Biscay. One of the largest is the Étang de Berre, in the dept. of Bouches-du-Rhône. It has communication by the Passe de Martigues, a narrow channel, with the Gulf of Foz and the Mediterranean. Its area is about 81 sq. m., and its average depth is 20 ft. It is noted for its eel fisheries and salt works.

**Étapes.** Town of France, in the dept. of Pas-de-Calais. It stands on the estuary of the Canche, 17 m.

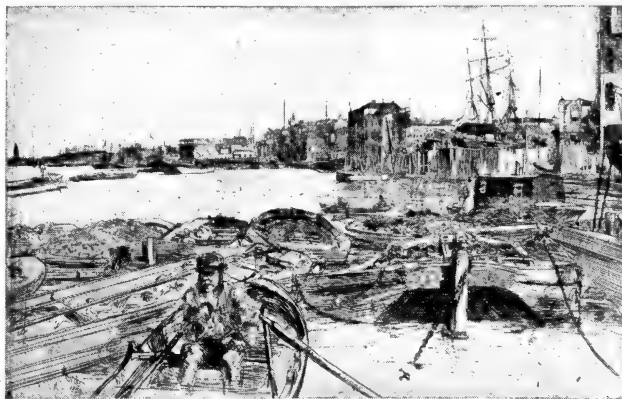


Étapes. Part of the huge encampment which was erected when the town was a British base during the Great War

S. of Boulogne, and near the coast. It is the railway terminus for Paris-Plage, and is a fishing centre. In early days it was a flourishing port, and here, in 1492, England and France made a treaty.

The Great War created a new Étapes of wider dimensions. It expanded N. along the main road to Boulogne, a city of hospitals in that direction, with the British military cemetery on the Camiers road, containing 11,300 graves. It was a huge British encampment of huts, tents, canteens, barbed-wire compounds, as well as a centre of the Y.M.C.A., Church Army, and other huts, Chinese coolie compounds, Red Cross centre, and motor traction yards. Here were extensive training grounds, including the well-known Bull Ring. It was noted as a British hospital and convalescent camp, and its Tipperary road leading to the latter on the hill-top was known to thousands of British soldiers. On May 19, 1918, the Germans made a night air raid on its hospitals, causing about 300 casualties among the nurses and patients. Pop. 6,000.

**Etawah.** District and town of India, in the Agra Division of the United Provinces. The district has an area of 1,691 sq. m. Fifty p.c. of it is under cultivation, the chief crops being wheat, gram, millet, and barley; cotton is also grown. Etawah town is situated on the Jumna and on the East Indian rly., 60 m. S.E. of Agra. It contains a mosque and a number of Hindu



Etching. The Pool, London, a typical etching by J. M. Whistler, dated 1859

temples. Trade consists largely in ghi, gram, cotton, and oilseeds. Pop. of dist., 760,121, 90 p.c. Hindus; of town, 45,350, 60 p.c. Hindus, 30 p.c. Mahomedans.

**Etching** (Ger. *ätzen*, to corrode). Method of engraving on metal either by biting with an acid a design drawn through a ground specially laid on the metal, or by drawing with a needle directly on the metal. Though several metals, such as iron, zinc, and pewter, have been employed, copper is almost universally used.

In etching by acid, the plate is covered with a coating of wax or other resinous substance, and to this ground are transferred the details of a drawing by laying upon it the paper upon which the design has already been made in black pencil or red chalk and passing it through a hand press. The drawing is then traced with a steel needle through the wax down and into the copper, and when it is finished the plate is submitted to the action of nitric or other acid. The parts that are to come light and sketchy are exposed for a certain time to the mordant and then "stopped out" with a suitable varnish to prevent further action of the acid in these passages; the parts which contain more work and are to be darker are exposed for a further period, and when sufficiently eaten are, in turn, stopped out; the parts which contain the heavy shadows and blacks are then exposed long enough to complete the erosion. The duration of the bath will depend upon the amount and elaborateness of the drawing.

In the dry-point method of etching, the artist draws his subject with a hard, sharp steel point upon a perfectly clean, unscratched, flawless copper plate. Dry point was also employed to some extent to define the general features of a

drawing that was to be finally treated by the method of line engraving, and, on the other hand, the graver was occasionally borrowed to open up work or strengthen an effect which the unaided needle could not satisfactorily accomplish. Etching dates from the time of Albert Dürer (1471-1528), who dry-pointed two or three plates in 1512 and etched a few more between 1515 and 1518, but no practitioner has ever equalled the wonderful productions of Rem-

brandt (1606-69). Modern etchers like Sir Seymour Haden (1818-1911), James McNeill Whistler (1834-1903), David Young Cameron, William Strang, Joseph Pennell, Muirhead Bone, and many Continental artists, carry on the best traditions of the art. See Short History of Engraving and Etching, A. M. Hind, 2nd ed. 1911; Modern Etchings and their Collectors, T. Simpson, 1919.

**Eteocles** (Gr., of true renown). In Greek legend, son of Oedipus, king of Thebes. See Oedipus; Polynices. *Pron.* Eti-o-kleez.

**Etesian Winds** (Gr. *etēsios*, yearly). Prevailing northerly winds blowing in summer in the Mediterranean region. They blow very strongly up the Nile valley, and are of great value to the dahabiyehs, as they help them to ascend the river against the current. See Wind.

**Ethane** OR ETHYL HYDRIDE ( $C_2H_6$ ). Gas discovered in 1848 by Frankland and Kolbe. It occurs in the gases evolved from oil wells, but can be made artificially. Kolbe obtained it by the electrolysis of potassium acetate and Frankland by allowing zinc ethyl to drop into iced water. Ethane is a colourless and odourless gas which burns with a faintly luminous flame.



Etching. Rembrandt with the Sabre, an etching by Rembrandt, dated 1634. Only four first impressions of this exist, one being sold in 1893 for \$2,000

**Ethel.** Anglo-Saxon word meaning noble and formerly spelt aethel. It is found as a prefix to many Anglo-Saxon names for both sexes, c.g. Ethelfrith and Ethelfleda. To-day its chief use is as a feminine Christian name.

**Ethelbert** (d. c. 616). King of Kent, son of Eormenric, and a descendant of Hengist. He became king about 560 and was defeated by the W. Saxons, 568. In 597 his over-lordship is said to have extended over all the English kings as far N. as the Humber. His wife was a Christian—Bertha, daughter of the Frank king of Paris, Charibert—and in 597 Ethelbert was baptized by S. Augustine. He issued in 600 a code of laws known as dooms (q.v.), one of the earliest documents in English. See illus. p. 753.

**Etheldreda**, SAINT (c. 630–679). Abbess of Ely, often called S. Audrey. The third daughter of King Anna of E. Anglia, she was born at Exning in Suffolk. Married first to Tonbert, an E. Anglian prince, secondly to King Egfrid of Northumbria, she shunned the married state and became a nun at Colindingham. About 672 she founded a monastery on her own estate at Ely and died June 23, 679. Ely Cathedral marks the site of her grave.

**Ethelfleda** (d. 918). Eldest daughter of Alfred the Great, known as the Lady of the Mercians.

Brought up at Alfred's court, she married Ethelred, earl of Mercia. After her husband's death, 911, she became sole ruler of Mercia, which she secured against attack by building numerous fortresses. In 916 she ended the incursions of the Welsh by taking Brecknock and capturing the king's wife. She died at Tamworth, June 12, 918, and was buried at Gloucester.

**Ethelfrith** (d. 617). King of Northumbria. He was the son of Ethelric, king of Bernicia, whom he succeeded about 593. He married the daughter of Ella, king of Deira, and drove out his son Edwin. In 603 he defeated the Scots at Daegsastan, and about 613 the Welsh at Chester. He was defeated on the banks of the Idle by Edwin's protector Raedwald, king of E. Anglia, and was slain in the battle.

**Ethelred I** (d. 871). King of Wessex and Kent. Son of Ethelwulf, king of Wessex, and elder brother of Alfred the Great, he succeeded his brother Ethelbert in

866. In his reign the northern kingdoms were in the hands of the Danes, against whom in 871 Ethelred and Alfred fought six battles, the most notable being the English victory at Aescesdun, or Ashdown. The white horse at Uffington, Berks, is traditionally supposed to commemorate this success. Ethelred made a pilgrimage to Rome, possibly in the hope of averting the Danish peril, and died of wounds received in battle, April 23, 871. He was buried at Wimborne.

**Ethelred II** (c. 968–1016). King of the English. Son of Edgar by his second wife Aelfthryth, he was known as the Unready or the Redeless from his inability to discern good rede or counsel. He succeeded his stepbrother Edward the Martyr, 979. In constant conflict with the Danes, he instituted the danegeld, for raising tribute to buy them off. In 1002 a general massacre of the Danes in England was carried out on S. Brice's day by Ethelred's com-

mand, which merely led to further invasions, higher danegeld, and eventually to the recognition of Sweyn, king of Denmark, as king of England. Ethelred fled to Normandy, 1014, but reigned again after Sweyn's death. His wife was Emma, daughter of Richard, duke of Normandy. He died April 23, 1016.

**Ethelwulf** (d. 858). King of Wessex. Son of Egbert and father of Alfred the Great, he succeeded his father in 839, Athelstan being made king of Kent. The Danes wintered in England for the first time in his reign. In 851 he routed them at Aclea, perhaps Ockley. He went on pilgrimage to Rome in 855 with his son Alfred and brought back a second wife, Judith, daughter of Charles the Bald. On his return he is said to have made over Wessex to his son Ethelbald, who in his absence had seized Kent, which Ethelwulf retained for his own rule. He was buried at Winchester.

## ETHER: ITS FUNCTION IN THE UNIVERSE

Sir Oliver J. Lodge, F.R.S., Author of *Man and the Universe*

*This article deals with one of the most interesting and difficult of all problems. See also Atom; Matter; Relativity*

Ether or Aether (Gr. *ailhēr*) is the name given to a super-sensible elusive medium supposed to fill all space, not only the space between the worlds, but the space between the atoms of matter even in the most solid object. Most authorities consider it to be an all-permeating perfectly continuous substance, linking the otherwise detached particles of matter together and welding the whole into a coherent cosmos.

This view regards the ether as responsible for gravitation and cohesion as well as for electric and magnetic attraction; but all this must be regarded as still to some extent hypothetical, since the theory of these forces has not yet been finally worked out. Indeed, a recent school of mathematical physicists seeks to dispense with the ether, or at any rate to proceed on the explicit assumption that we shall never know anything about it, so that for all practical purposes we may concentrate our attention on matter alone. This doctrine, the principle of relativity, leads to remarkable consequences, some of which have apparently been verified.

We shall assume, however, that the ether exists, and that it is proved to exist by facts ascertained concerning light. Light is known to be a tremor or excessively rapid vibration, too rapid to be associated with the properties of any ordinary matter. The ether

therefore is assumed not to be ordinary matter, though it may be the fundamental substance out of which matter is made.

We do not know many of its properties. The most definite thing we know is that it transmits every vibration that can be imparted to it with the enormous speed of 300,000 kilometres, or roughly 187,000 m. per sec., a rate which would enable a flash of light to travel from London to New York and back in the twinkling of an eye.

Whether these vibrations or so-called waves are long or short, whether they are ultra-microscopic ones such as appeal to the eye, or are the immensely large ones employed in wireless telegraphy, makes no difference to the rate at which they travel. Hence the ether must be of simple constitution. When light enters matter, it is retarded; and if the matter is not quite transparent, some light is absorbed and converted into heat; but no such accident happens to it in the ether, which is perfectly transparent. The velocity of light is a definite physical constant in free or empty space, and as it proceeds on its way it is enfeebled only by gradual spreading out, not by conversion into some other form of energy. The term "empty space" means space empty of matter but full of ether; no space empty of ether can be imagined. The ether is a positive name for



Ethelfleda, daughter of Alfred the Great  
From an old engraving

the negative idea of a perfect vacuum, and we know that it contains ether because light can travel across it.

Sound has no existence in a vacuum; nor heat either; both are affections of ordinary matter, and apart from matter are non-existent. This cannot be said of either light or magnetism or electricity, though it is true that in order to detect and display these agencies a material medium or instrument is necessary.

The eye is a physiological organ adapted for the reception and detection of ethereal tremors; so is a photographic camera with its sensitive plate. Without the eye we should be wholly ignorant of the ether, and it is the only organ of the body which responds to ethereal influence. The information which it conveys to us, however, is not about the ether, but about the material bodies which have either emitted, scattered, or otherwise modified ethereal tremors.

Light conveys to us certain information about the source emitting it, and hence, by what is called spectrum analysis, the constitution of sun and stars has been chemically examined, and their relative motions along the line of sight have been measured.

Even the constitution of atoms is yielding to the scrutiny made possible by still finer kinds of ethereal vibration, those known as ultra-violet light and X-rays. For these are ether-tremors emitted by electric particles vibrating or revolving with incredible rapidity, thousands of millions of million times a second.

#### Density of Ether

It used to be thought that the ether was an exceedingly tenuous rarefied substance, far more subtle than any ponderable matter, and this is the meaning which poets associate with the word ethereal. In fact, a series of chemical liquids have been rather inconveniently designated "ethers" by chemists because they are lighter and more mobile than water. But the modern view of the ether of space is that it must be at least as dense and substantial as any form of matter which exists in it. If atoms of matter are in any way composed of ether, and if the ether as a continuous medium is incompressible, then no atom of matter can be denser than the medium of which it is made. And inasmuch as we now know that matter, even the most solid, is excessively porous, and consists of specks permeated by otherwise empty space, it has become probable that the ether is immensely more substantial than

lead or gold or platinum; in fact, as some think, more than a million times as dense.

But here we are getting out of our depth. The density of the ether is not yet known. But we should remember that the word ethereal, when it signifies properties relating to the ether, need not mean ethereal at all, and had better not be so spelt; there is literary authority for both spellings, and the meanings associated with them are clearly different.

The modern view of matter is that matter, and not ether, is the rare and tenuous substance; a milky way or gossamer structure of detached particles, immersed in a substantial medium, and held together by the force which it exerts; that is how matter now appears to a physicist.

#### Electric and Magnetic Properties

A difficulty is sometimes felt as to how bodies can move through a dense or massive ether, and the question has not been finally answered, but it is clear that the ether possesses no viscosity, and so causes no frictional resistance to motion. It is certain that motion is the fundamental property of matter, and it is almost equally certain that the ether as a whole is at what we should call at rest. But it is susceptible of elastic strain, and therefore is responsible for the recoil and restoration of particles of matter when, as in a spring or raised weight, they have been displaced from their equilibrium position. One way of expressing that is to say that all potential or static energy is possessed by the ether, while kinetic energy is possessed by matter.

The properties of ether are perfect; it has no opacity, nor any kind of imperfect elasticity. In other words, it dissipates no energy, but stores without loss anything committed to it. It is in the interaction of matter and ether that loss or dissipation occurs. A medium filling all space was originally needed for carrying light, whence it was called the luminiferous or light-carrying ether, but it is also required to explain most of the phenomena of electricity and magnetism, both of which agencies are at home in a vacuum, and are only modified by ordinary matter. The ether must have both electric and magnetic properties, and Clerk Maxwell discovered that these electric and magnetic properties were both utilised in the propagation of light, so that for the first time it was perceived that light was an electro-magnetic phenomenon. Ether waves can be excited by any rapid electric or

magnetic oscillation, just as sound is excited in air by a rapid mechanical oscillation. Electric oscillations are employed in wireless telegraphy, and if they are of sufficiently high frequency they appeal to our eyes as light.

#### Matter and Ether

At a time when the oscillations of ether were considered to be mechanical vibrations, the ether was thought to be analogous to an elastic solid and was likened to a jelly. Now that we know the oscillations to be electro-magnetic, these analogies become unserviceable. People sometimes think that contradictory properties have to be attributed to ether; but these belong to the exploded elastic solid theory, and are only appropriate to a mistaken view as to its constitution.

Electric strain can exist just as well in a fluid as in a solid, for the strain is not really in the matter, but in the intervening and connecting medium. It is not to be supposed that the ether is structureless; it is continuous, and yet it may be in a constitutional state of vortex motion; but if so its elements or units of intrinsic motion must be excessively fine-grained, far finer than even the electrons which stand out in it as knots or singularities, related to the main bulk of the ether of space somewhat as an ordinary knot is related to the rest of a piece of string. We cannot press this analogy, or any other, at present, for we know too little about it. Nor do we know as yet whether human beings, or living things generally, make any use of ether, after the same fashion as they make use of ordinary matter. Much remains to be discovered about the interaction between matter and ether, and still more about the interaction of life and mind with both.

**Ether (ETHYL ETHER)** ( $C_2H_5$ )<sub>2</sub>O. In chemistry, a colourless, inflammable liquid, lighter than water, prepared by heating together a mixture of sulphuric acid and alcohol. First described by Valerius Cordus in 1540, the product made by his method was employed as a stimulant, later popular as Hoffmann's drops. S. A. Frobenius in Great Britain communicated to the Royal Society a recipe for making ether, 1730-41.

The chemical name is ethyl oxide. Boullay's process is generally followed in its manufacture. This employs nine parts of concentrated sulphuric acid to five parts of 90 p.c. alcohol, and is continuous, i.e. by adding fresh alcohol the etherification is continued with

the same sulphuric acid. Heckmann's apparatus is employed on a small, and Barbet's on a commercial, scale. The product is further purified by re-distillation over calcium chloride. Owing to its inflammable nature, special precautions have to be taken against fire and explosion. Large quantities of ether are used in the manufacture of cordite, aniline dyes, and artificial silk. As a solvent of gun-cotton it is employed in making collodion, used in the wet-plate process of photography.

In medicine, ether is employed in doses of 15 to 30 minims for repeated administration, and 45 to 60 minims for single administration. The following preparations of ether are also used: *spiritus aetheris*, ether 1 part and alcohol 2 parts, dose 20 to 40 minims repeated, 60 to 90 minims single administration; and *spiritus aetheris compositus*, or Hoffmann's anodyne, in the same doses. Ether evaporates rapidly, producing great cold, and a spray directed against the skin eventually numbs sensation sufficiently to permit the performance of small operations. Small doses act as gastric stimulants, and are of service in various forms of dyspepsia. Ether also stimulates the heart and is an excellent restorative in cases of fainting. Its most frequent use is as a general anaesthetic, either alone or in combination with chloroform. Though less dangerous than chloroform, it is more apt to irritate the respiratory passages, and should not be administered to those suffering from bronchitis.

**Etherege**, SIR GEORGE (1634-91). English dramatist. Born of an Oxfordshire family, he studied law, but gave his time mainly to the life of a man of fashion. In 1664 his first comedy, *The Comical Revenge, or Love in a Tub*, was produced at the Duke's Theatre, and from that time its author's name and fame were assured. A second, *She Would if She Could*, and then a third, *The Man of Mode*, followed, each a distinct success. In 1685 Charles II, having knighted Etherege, sent him to represent England at Ratisbon. In 1688 he left that city, and passed most of his later life in Paris.

Etherege may be described as the originator of the modern comedy of social life. His knowledge of the life of his time was complete, and his portraiture of its gallants, ladies, and their surroundings perfect. See *Works*, ed. A. W. Verity, 1888.

**Ethers**. Oxides of the alcohol radicals formed by the elimination of water from two molecules of

alcohol. Ethers which contain the same radical twice are termed simple ethers, those which contain different alcohol radicals, mixed ethers. The chief method of preparation is by the action of sulphuric acid on the alcohols. Another method is to dissolve metallic sodium in ethyl alcohol and warm the sodium ethylate, when ethyl oxide is obtained. Ethers are volatile bodies and are either gases, liquids, or solids. Cetyl ether is solid, methyl ether gaseous, and ethyl ether (ordinary ether) liquid.

**Ethical Society**. Society founded for the culture of morality apart from theology. Its members profess freedom from all religious

creeds, but opposition to none. The movement began in the U.S.A., largely through Felix Adler, who founded the New York Ethical Society, in 1877. It spread to England, Stanton Coit (*q.v.*) and Moncreu D. Conway (*q.v.*) doing much for its advancement. South Place, Finsbury, E.C., and the W. London Ethical Church, Bayswater, W., are the principal London centres. The more important English ethical societies are federated in a Union, the offices of which are at 19, Buckingham Street, London, W.C. The ethical movement has a number of periodicals, conducts Sunday schools, classes and lectures, and has a large membership.

## ETHICS: THE PROBLEM OF CONDUCT

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*Further information on Metaphysics, of which Ethics is a branch, will be found in the articles Metaphysics; Philosophy; Psychology. See also biographies of Aristotle; Green; Hegel; Kant; Plato, and other philosophers*

Ethics is the inquiry into human conduct in so far as conduct is right or wrong, or has moral value. The term good is used to denote that which possesses such value, and thus ethics is sometimes described as consisting of an inquiry into the meaning of good. It is to be distinguished from anthropology or sociology, sciences which do not exclusively refer to moral values, being mainly descriptive or scientific, while ethics is essentially reflective or philosophic. "How is human life organized and carried on?" is the question of sociology and allied sciences. "What is the aim of human life, and what the chief end of man's activities?" is the question which ethics has to answer. Starting with men's moral judgements of right and wrong, of good and bad, it asks what they imply as to man's nature, in what relation they stand to scientific and aesthetic judgements, and how and in what sense they are objective.

### Economic Activity

The fundamental conception of ethics is that of value. It assumes that man is not an animal with certain fixed wants, whose different actions are merely different ways of satisfying the same fundamental needs, but that, over and above his simple physiological requirements, man has other wants, changeable and changing, between which he chooses. This act of choosing between different wants, or the preference of one satisfaction to another, is valuation.

From this valuation or appraisalment of wants must be distinguished the actual steps which have to be taken to satisfy these wants, or the discovery of means

towards the ends which man has approved. Generally speaking, this may be called the sphere of economic activity, whether technical, if occupied with the adaptation of the material world to man's peculiar wants, or economic in the strict sense, if occupied with men's relations so far as they will produce most efficiently what man wants. Economic activity, then, unlike ethics, takes for granted the end of man's efforts and deals solely with the means to attain that end. It is not immoral, but simply non-moral.

### Naturalistic Ethics

Some have denied that this distinction between these aspects of human conduct exists. Naturalistic ethics tries to show that man's conduct can in all respects be explained by the working of certain evolutionary laws and forces. Behaviour, it is argued, has not changed owing to any change in the conception of the end to be attained, but, being directed always to the one end of the survival and continuance of the human species, has only altered with changes in human environment. Were this conception true, ethics would become only one part of biological science. Looking more closely, however, at the struggle for survival, it is plain that both degeneracy and progress have been produced. The survival of the fittest means strictly the struggle of the fittest to survive, and the judgement that the results of the process are some good and some bad, cannot be got from the process itself, but from ethical reflection upon it. Adaptation to environment must certainly be taken into account in a history of ethics,



but no less must ethics make allowance for those variations in the ultimate standard of life for which men are prepared to struggle. The attempt to explain history by assuming that men's aims are all ways the same will not fit the facts.

This distinction between technical activity and conduct was first elaborated in Greek moral philosophy. The ethics of Plato deal with the good of the individual, the good of society, and the relations existing between them. Thus, in *The Republic*, he sought chiefly to determine the nature of justice as such, and the means of attaining justice in the relations of men, i.e. in society. He showed that life could be regarded as divided between a number of skilled processes or arts.

#### Plato and Ethics

Conduct, however, was not one of these, but was concerned rather with the relations between the ends of all these human processes and the relation of these ends to life itself. All the arts and activities of life he regarded as subordinate to the one purpose of life as a whole, which he called the good. This idea of the good is at once the eternal object of all human speculation, and a practical ideal capable of human attainment, such as justice or temperance. Ethics, then, was an inquiry into the good which all men sought, but the nature of which none properly understood. Greek thought sometimes regarded the good as attainable by the harmonious adjustment of human desires to one another, making pleasure, or the satisfaction of the greatest possible number of desires, the *summum bonum*, or highest good. But Plato showed that such a harmony was impossible without the recognition that certain activities or wants of the soul were higher than others. Thus, though Plato still regarded ethics as a matter of knowledge, he made clear that knowledge of the good was different from skill and involved certain emotional elements, was not in fact purely a matter of reason.

Aristotle elaborated the distinction between knowledge and moral insight, dwelling especially on the nature of the deliberate choice or will of man in his search after the good life. Here he insisted that both emotional and intellectual elements must be recognized, and pointed out that in an art the end existed outside the means, calling therefore for knowledge, while in conduct the end lay within the act itself, a recognition of moral insight.

Greek moral philosophy, however, preoccupied with the notion of the supreme good, remained intellectualistic, as may be seen in its difficulty in explaining that outstanding fact in human conduct, moral conflict and the weakness of the will. Characteristic also was the Greek identification of ethics with politics. The relations of men with each other were conceived as analogous to those of the different desires within the individual, a manifold to be reconciled within the harmony or unity of the good life, that is, according to Aristotle, the complete exercise of man's rational functions which differentiate him from the rest of creation. Other important schools of Greek ethical thought were those of the Cyrenaics and Epicureans, who interpreted morality in hedonistic terms, and those of the Cynics and Stoics, who held rational virtue to be an end in itself.

In modern times the greatest influence has been the growth of the natural sciences with their view of nature as one deterministic system. This assumption made a sharp contrast with the Christian, and especially the Protestant, insistence on the absolute worth of the individual, and so has focussed ethical inquiry on the problem of the freedom of the will.

#### Immanuel Kant

The modern point of view is represented better by Immanuel Kant than by anyone else. He regarded the outstanding fact of conduct as the contrast between what is and what *ought to be*, and emphasised the impossibility of deriving the latter from the former. However much we may learn of the influence of heredity and environment upon human action, the statement that an action is wrong implies that it ought not to have been done, and therefore need not have been done. Here is the contrast with the deterministic conceptions of modern science. The possibility of alternatives of action is as fundamental for human conduct as determinism for the natural sciences.

How the two are to be reconciled is a matter for metaphysics. Ethics is content to show that conduct implies a definite principle of action, not inconsistent with man's heredity or environment, but different and undervivable from such influences. The judgement of value, then, so closely bound up with conduct, is seen to tell us something about the nature of man.

How its undervivable and immediate character is consistent with the change and development of ethical judgements in history; how ethical

progress takes place in the developed moral insight of individuals; how ethical progress finds expression in a system of social rights and obligations; how moral judgements imply something more than the mere results of human reasoning, and yet may have an objectivity different from, but as real as, that of scientific judgements—these are the questions with which ethics is concerned.

*Bibliography.* Prolegomena to Ethics, T. H. Green, ed. A. C. Bradley, 1883; *The Theory of Good and Evil*, H. Rashdall, 1907; *A Study of Ethical Principles*, James Seth, 10th ed. 1908; *The Classical Moralists*, B. Rand, 1909; *Ethics*, John Dewey and J. H. Tufts, 1909; *Manual of Ethics*, J. S. Mackenzie, 5th ed. 1915; *The Method of Ethics*, H. Sidgwick, 6th ed. 1901.

**ETHIOPIA** OR AETHIOPIA (Gr. *Aithiopia*). In ancient geography, name given by the Greeks to the whole of Africa from the Red Sea to the Atlantic, in a narrower sense to the territory comprised in the modern Nubia, Sennar, Kordofan, and part of Abyssinia. The name, derived according to Greek popular etymology from *aithen*, to burn, and *ōps*, face, was originally applied to all countries inhabited by persons of dark-brown or black colour, the result of the heat of the sun. In the Homeric poems the Ethiopians are described as dwelling on the uttermost confines of the earth, a pious and blameless people, often visited by the gods. According to Herodotus, they were divided into the straight-haired Ethiopians of the E. and the curly-haired Ethiopians of the W.

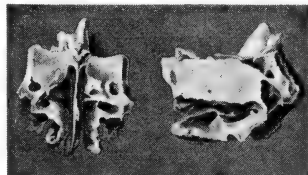
From the earliest times the history of the country was intimately connected with that of Egypt, which was more than once under the rule of Ethiopian kings. The first Ethiopian kingdom was that of Napata (mod. Merawi), founded about the 11th century B.C. After the invasion of the country by Cambyses in 524 B.C. the capital was removed to Meroë (Assur, near Shendi) in the S., and a new kingdom arose which lasted until about the beginning of the Christian era, chiefly ruled by princesses called Candacæ, probably not a name but a title like Abgar and Pharaoh. The Romans made expeditions into the country, in one of which (24 B.C.) the Ethiopians suffered a severe defeat; but the conquered territory was abandoned by order of Augustus. The name Ethiopia is also given to a Christian kingdom established in the Abyssinian highlands, with capital Axumis (mod. Axum). This was the origin of the empire of Abyssinia, the official title of which is still Ethiopia.

The inhabitants of Ethiopia were of Semitic origin, and spoke a language called Geez, which showed greater affinities with the Arabic of the Sabaeans in S. Arabia than with classical Arabic. The alphabet was perhaps of Phoenician origin. There was an Ethiopic version of the Bible, including various apocryphal books added to both the O.T. and the N.T. Geez was superseded by Amharic as the official language, but continued to be used in the churches and in literature. It is now represented by two dialects, Tigre and Tigräi. See Abyssinia; also *illus. facing p. 129.*

**Ethmoid Bone** (Gr. *ēthnos*, strainer, sieve; *eidos*, form). Bone which projects downwards from the frontal bones of the head. It enters into the formation of the floor of the cranium, the orbits or

eye-sockets, and the deeper parts of the nose. Roughly cuboid in shape, it is of a spongy, porous consistency, a very complicated structure, and contains a number of small cavities.

**Ethnography** (Gr. *ēthnos*, nation; *graphein*, to write). Branch of anthropology, which comprises



**Ethmoid Bone.** Left, front view of the bone; right, side view

the study and description of various nations, in reference to their distinctive material characteristics.

## ETHNOLOGY: THE SCIENCE OF RACE

Sir H. H. Johnston, G.C.M.G., K.C.B., etc.

*One aspect of a great question is here discussed. See also Anthropology; Family; Tribe; also articles on American Indians; Celt; Slav; and other branches of the human race*

This term is artificially derived from Greek words, meaning a discourse about human races or nations; but has gradually come to mean the science dealing with the results of man's mental development in contradistinction from Anthropology.

The classification of existing human races or sub-species belongs rather to anthropology proper than to ethnology, which deals with the history, distribution, and intellectual achievements of *Homo sapiens*. But for the better understanding of the ethnological discussion which follows, we might briefly consider the present racial divisions of humanity and the criteria on which they are based. In this classification we can only take into consideration physical traits; it is useless to go by mental developments and degrees of culture, since these vary according to circumstances, and not always according to the size or structure of the brain.

The comparative size and weight of the brain is of some importance. For instance, the Australoids and Melanesians are set apart from the other sub-species of man by their lower average in skull capacity and weight of brain, and by the retention in the conformation of the brain of a few anthropoid features. The hair of the head and body is another criterion in race classification. The two extremes in hair are that of the Negro—flat in section and curly—and that of the

Mongol-Amerindian—round and straight. The hair of the white man varies between these two extremes and further tends in the N. European to be flaxen, brown, or red—characters which also reappear among the Berber mountaineers in N. Africa and the Aryan tribes of Afghanistan and the Hindu Kush. Stature is a variable factor. The Negro sub-species includes both the shortest and the tallest men. Skull form, round and broad, narrow and long, with or without strong brow ridges, prognathous, or vertical from brow to chin, and the conformation of the lower jaw are points of great importance in classification. Skin colour is accepted as a general characteristic of each distinct sub-species; that is to say, the Australoid is usually brown, the Negro black, the Mongol-Amerindian yellow, and the European white.

### Primary Divisions of Mankind

The generally accepted primary divisions of existing humanity are as follows:

*Homo sapiens australis*.—The Australoid.

*Homo sapiens aethiops*.—The Negro.

*Homo sapiens mongolicus*.—The Mongol and Amerindian.

*Homo sapiens europaeus*.—The White Man.

The first of the four may be further sub-divided into the Vedda and Dravidian types of India and the Melanesians of Oceania; the second into the Bushman, the African Negro, the Asiatic Negro, the Oceanic Negro, the Papuan and the extinct Tasmanian; the third

into the true Mongol or Kalmuk, the long-headed Eskimo, the Tibetan, Chinese, Indo-Chinese, and Malay; and into the main stocks of the Amerindian; and the fourth into Nordic (Aryan), Mediterranean, and Armenian-Alpine Man. There are also indeterminate and composite human races obviously derived from comparatively recent intermixture, such as the Finns and Lapps of N. Europe, the Egyptians, the Hamitic and Sudanese Negroids of the Sahara, W. and E. Africa, the Gala-Somali (ancient hybrids between Mediterranean man and the Negro), many tribes in India composed of Negro, Mediterranean, Nordic, Australoid, and Mongolian elements; the Indonesians, and the Polynesians resulting from a fusion of Indo-Mediterranean man, and the Mongol-Malay, Melanesian, and Oceanic Negroid; the Ainu of North-east Asia, very primitive "white men," not without ancient Australoid affinities and Mongol-Amerindian intermixture; the very composite Japanese and Formosans, the Malay-Negro hybrids of Madagascar, the Australoid-Negro Papuans of New Guinea and the E. islands of the Malay Archipelago.

### Origin of Man

In what part of the globe did *Homo sapiens* originate? Almost certainly not in America, because in the New World no fossil remains have ever been discovered showing the existence there at any time of such Old World apes and anthropoids as are known to be the nearest relations of the human family. Moreover, up to the present time, no vestiges have been discovered in the New World of any human type approximating more than *Homo sapiens* in its skull formation or bones to any more ape-like stages in man's ancestry.

On the other hand, such remains have been found in the Old World: in Java, for example, and in the English county of Sussex, in Germany, France, Spain (Gibraltar), and Austria. And there abound in Asia and Africa at the present day living human types on the very borderland of the *sapiens* species, which still exhibit in teeth, limbs, face, viscera, and brain remarkable affinities with the ancestral and more anthropoid forms of the human stock. Perhaps the most "Simian" type of humanity, *Pithecanthropus erectus*, may have only been a late survivor in Java of an early type of Man, and there exist reasons for thinking that he migrated thither from India, and represented the transitional form between the actual Ape and the actual Human which must



the N.E. and E. of New Guinea, and a very generalised type of negro existed in Tasmania down to the close of the 19th century. Oceanic negroid influence extends even to Hawaii, Fiji, and New Zealand. But there are also traces of considerable ancestry indicating a negroid race inhabiting S. France and Italy, rather more related in head-form to the Asiatic than to the African negro. Skulls of a somewhat generalised negro type have been recently discovered in E. Africa and at the Cape of Good Hope. In probably very ancient days, the negro sub-species somewhere in N. Africa, possibly in the Sahara Desert, gave birth to a remarkable variant, the Bushman, not necessarily a negro pygmy, because in some districts he attains to almost normal height, but very specialised in regard to head-form, bodily conformation, and the peculiarities of certain organs. The Bushman seems to have been pushed by force of circumstances across the Sahara into Nigeria, and more particularly into equatorial E. Africa. South of the Victoria Nyanza he has left traces of his remarkable type of language, with its baboon-like clicks. But it was in the sterile region of S. Africa that the "Bush" type attained its most marked development, and there alone it is now found.

#### Migrations into America

Human migrations into America seem to have begun in the interglacial episodes of warmer climates, when N. America was more or less broadly connected with N.E. Asia. Quite possibly the first human type to cross by this land bridge from Kamchatka to Alaska was more akin to the Australoid, and later to the primitive Ainu-like type of White man that developed out of the Australoid. This last-mentioned is the predominant type of the Russian population at the present day, and recurs again with a marked resemblance in N. Japan and amongst the coast tribes of British Columbia. But the dominant human type to colonise the New World in early times was certainly Mongol—a generalised Mongol, mixed, it may be, with the Crô-magnon race of Europe and Asia, and resembling further the generalised Mongolians of the Malay Archipelago.

This mixed Mongolian followed closely on the heels of the early Australoids and Ainu, and rapidly penetrated America till it reached the S. extremity. Mongoloids, consequently, formed by far the bulk of the aboriginal population of all America. The peoples of east or forested S. America,

especially Brazil, resemble very closely in appearance, and even in manners and customs, the Mongoloid peoples of Borneo. In prehistoric times there was a drift of human emigration across the Pacific from islet to islet and archipelago to archipelago, until at last western S. America, and perhaps Central America, were invaded by Polynesian Mongoloids, akin in race to the Moriori type of prehistoric New Zealand and of the Chatham Islands.

#### Japanese and Amerindians

Probably in much later times, when the Mongol peoples of China and Japan acquired sufficient knowledge of shipbuilding and navigation, ships manned by these people were occasionally stranded on the Californian coast, giving an early Japanese civilization to the Amerindians of Central America. A recent interesting theory is that the Phœnicians of the Persian Gulf and S. Arabia first of all opened up trade with Peninsular India, and thus gave such a tremendous impulse to the adventurous semi-Caucasian element in N., Central and Further India, that not only was the shipping trade opened up with China a few centuries before the Christian era, but this Phœnician-inspired adventure in the Far East was followed by a crossing of the Pacific.

Probably, too, after the beginning of the Christian era there still occurred from time to time Asiatic immigrations into N. America by the short canoe journeys across Bering Straits. The Eskimo race seems to have originated in boreal Asia or Europe. Though closely allied to the typical Mongol, it is long-headed and not broad-headed. There is evidence of Eskimo culture and race having extended to the N. of Scotland. In the New World they only colonised the N. of Alaska, the extreme north of the Canadian Dominion, and Greenland; but in course of time they extended S. almost to Nova Scotia. But in addition to the Eskimo in comparatively recent times it would also seem as though the Tartar and Ainu peoples of N.E. Asia found their way into S. Alaska and eventually influenced the Red Indian tribes of N. America.

After remaining for some 100,000 years but sparsely populated with humanity, the American continents attained an amazing development in human history, following on the discovery of Columbus. In the 17th century began the great set of the human race from the Old World towards the New—an outstanding event in human his-

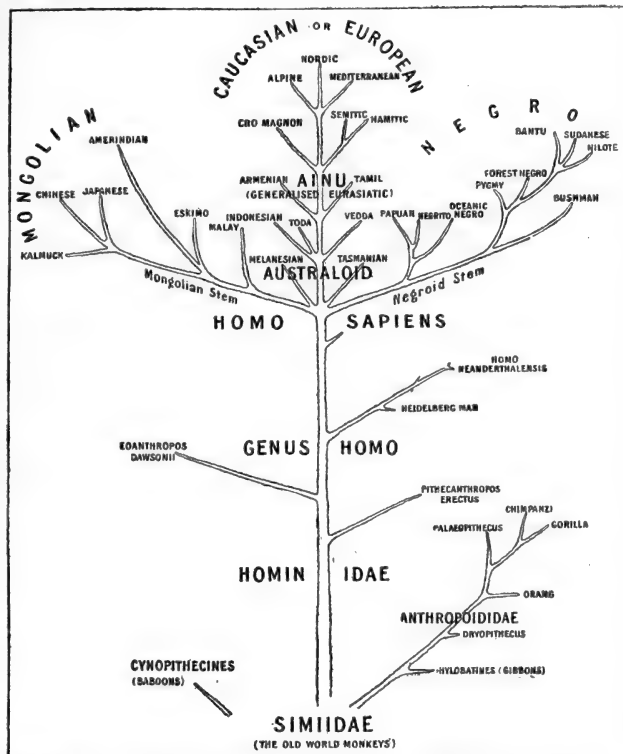
tory which culminated early in the 20th century. Central and S. America were first colonised on a large scale by Spaniards and Portuguese, who further introduced the negro from Africa. The more Nordic races of N.W. Europe colonised N. America—French and British, together with a certain number of Basques.

N. America has now a White population of 100,000,000, chiefly representative of the physical types of Britain, W. and Central Europe, with, however, a large number of Jews and a not inconsiderable recruitment of Syrians. The European element in S. America is mainly Spanish, Portuguese, and Italian, but there still remain some 16,000,000 of Amerindian race, and these Amerindians in Brazil have mingled extensively with European immigrants or with negroes. Negroes constitute the main type of population in the Guianas, in portions of E. Brazil, as well as in the S.E. States of N. America. But a remarkable change is taking place in the distribution of the N. American negro. Owing to the discomforts and disabilities inflicted on him in the S.E. States, he is migrating to the N., the W., the centre, and to Canada.

Reviewing the prehistoric past of Europe we find, especially in W. and S. Europe, indications that after the anthropoid Piltdown man and the aberrant Neanderthal—who differed so much from *Homo sapiens* in the structure of his teeth, skull, and skeleton, that it is difficult to believe he was able to mingle with *Homo sapiens* and leave hybrids behind him—had passed away, the next stage of human types was somewhat Australoid in physical characteristics, with even a negroid development on the Mediterranean shores.

#### The Crô-magnon Race

But as the recurrent glacial periods gave way to more normal conditions of climate, there appeared in France—possibly emigrating thither from W. Asia—the remarkable Crô-magnon race, of large brain development, tall stature, and great talent in the arts, altogether a superior form of Man. The Crô-magnon had rather projecting cheek-bones and is thought to have resembled the handsome, dark-skinned peoples of N. India, or the better-looking types of Amerindian in N. America. He gave human culture a decided uplift, and was a conqueror and successful invader of many regions. Possibly he not only entered N. Africa, but penetrated southwards across the Sahara into southernmost Africa, and was the origin of the Strandlooper



**Ethnology.** Man's family tree. A diagrammatic representation of the emergence of the human race from its early origins. From the *Simiidae* or man-like apes there is gradually developed, through stages not yet fully explored, the family *Hominidae* and finally, the genus *HOMO*, which culminates in the species *Homo sapiens*. This species, represented in its primitive form by Australoid types, branches along Mongolian, Eurasiatic, and Negroid stems into numerous specialised races, whose movements and inter-reactions are described in the article. Note the Ainu type of N.E. Asia, intermediate between the Australoid sub-species and the highly developed European; it has probably influenced the development of the Russian, E. Asiatic, N.W. American, and other important peoples.

art and civilization which existed thousands of years ago in Cape Colony. The Crô-magnon apparently also entered, if he did not come from, Central Asia. He may even have migrated across Bering Straits and influenced the Red Indian peoples of N. America.

In course of time he gave way in Europe to shorter and less remarkable types of humanity. By that time the dominant human in S. and W. Europe was of the Iberian or Mediterranean race, a white man with dark hair and dark eyes, of medium stature and somewhat hairy face and body. This Iberian type certainly penetrated to the British Islands and subdued and absorbed the pre-existing Eskimo and Ainu breeds. The Mediterranean race spread over Asia Minor, mixing with the Armenoid or Alpine (which had also invaded Central Europe), the Arabian Peninsula, and much of N. and N.E.

Africa, forming subsidiary races by mixing with the earlier Dravidians, Australoids, and Negroes. The Mediterranean race produced by intermixture the Dravidian that preceded the Nordic Aryan in the conquest of India. This ever more diluted Mediterranean race may even have started the Indonesians, that semi-white people which penetrated into Further India, and into the Malay Archipelago and parts of New Guinea, and ended up by colonising New Zealand and most Pacific archipelagoes between 2,000 and 600 years ago.

To a great extent the Mediterranean race stands for the typical Caucasian. In the early days of ethnological study the superior White was named Caucasian because it was erroneously thought to be represented by the people of the Caucasus, but these are compounded really of mixed elements. Perhaps the best example of the

Mediterranean race is the Berbers of N. Africa, where they are free from intermixture. The Semite stock from which the Arabs are descended has a Mediterranean basis, but contains also Armenian (Alpine) and Asiatic Negroid blood, besides here and there a Mongolian element derived from the early Mongolian colonisation of Mesopotamia.

In Old World dominance, the Mediterranean or brunet type of White man was succeeded by the Nordic peoples of N. Europe. No doubt there is Crô-magnon blood and influence in the Nordic stock. The early Nordics were certainly tall, but their most striking variation from preceding types lay in their development of red hair, which further specialised into the yellow-brown, flaxen, golden, or even lint-white; while the brown iris of the eye changed into grey-green or blue-grey. This type at present is purest in Scandinavia and in N. Germany and N.W. Russia. The Goths of history were of pure Nordic stock. The Caledonians of N. Scotland represented a more primitive offshoot, with red hair and rough-hewn facial features of the Crô-magnon type.

This tall, fair-haired, grey-eyed or blue-eyed man first began to trouble Mediterranean Europe over 3,000 years ago. He originated the Aryan languages and carried them into W. Asia and India. But in culture he had been forestalled in W. Asia by the Alpine or Armenoid stock, a squarer or rounder-headed variant of the Mediterranean race. The Armenoids had civilized the Mongols of Central Asia, thus starting the civilization of China 3,000 to 4,000 years ago, as earlier still they had started that of Mesopotamia.

#### Aryan Influence

The Aryan conquest of Europe and Asia was due in the main to the Aryan discovery of the uses of iron in Central or N. Europe, and the iron weapons with which they could overcome the S. races using weapons of bronze or stone. These golden-haired, blue-eyed Aryans descended with their Aryan languages on the Balkan Peninsula, and, by fusion with the Mediterranean race and civilization of the Aegean, founded classical Greece. They equally founded the empire of Rome by invading the Italian peninsula and subduing the Etruscans and Ligurians. More than 3,000 years ago they had Aryanised Sicily.

In Central Europe they originated the Celtic race, which mingled freely with the Armenoids of the Bronze period. The Aryan



Celts crossed France and invaded N. Spain. They passed from France or Belgium into Britain, spread to N. Scotland and all over Ireland. In Ireland they remain mixed with the pre-existing Iberians, and therefore require to be known (as in N. Spain) as Celtiberians. This Celtiberian type in England and Scotland was overlaid by a much later Celtic invasion of the Belgae or Britons, surviving in language in Wales. The Celts over-spread Holland and Belgium and probably Denmark, and most of S. Germany, Austria - Hungary, and perhaps S. Russia. The Aryan invaders of N. Persia and Armenia were more related to the early Aryan peoples of Russia, whose language type survives in Lithuania. Allied with these invaders of Persia were those who colonised much of Turkistan, Afghanistan, and N. India, and originated the Sanskrit language.

#### Goths, Germans, Northmen

The next great Aryan uprising was the Gothic, followed by the German, divided again into the High German or Alemanic and the Low German or Frank. One branch of Low German speech was Frisian, whence came Anglo-Saxon and modern English. Then came the Scandinavians or Northmen, who originated modern Scandinavia, and profoundly affected the history of the British Isles, Iceland, prehistoric N. America, Sicily, S. Italy, and the Byzantine empire. Originally, the Scandinavian people only occupied the extreme S. of Sweden, the Danish peninsula, and S. Norway, with the islands off Finland and patches of N.W. Russia.

Their predecessors in Scandinavia were Mongol types culminating far back in the European Eskimo. Russia was peopled in the N. by the same Mongol races, and over the rest of the area anciently by a primitive type of white man akin to the Ainu of Japan, noteworthy for their hairiness of face and body. From these dark-haired forms of white man arose the Lithuanians, who were early Aryanised by the Nordic peoples and still speak a primitive Aryan language. In time the Nordic races romped over Russia on their way to invade W. Asia. The Goths became dominant in Russia in the first half of the Christian era, and Gothic was spoken in S. Russia down to a few centuries ago.

We cannot leave out of account the effects of the Arab outpouring in the 7th century A.D. They re-Semitted Syria (fast becoming Hellenic), paved the way for the

Turkish invasions of Asia Minor and the Persian culture-conquests of India and Central Asia. The Arabs awoke the Berbers of N. Africa and carried Hamitic N. Africa into Spain and France and across the deserts into W. Africa and the Niger Basin, the Egyptian Sudan and E. Africa, till at last their influence reached the confines of Zululand, and even permeated much of the N. and E. watershed of the Congo. They Arabicised India and Malaysia to the verge of New Guinea and the Philippines.

After the Aryan migrations, the next great event that affected Europe and Asia was the boiling over of the Mongol tribes of N.E. and Central Asia. These, as Huns, Avars, Turks, and Tartars, ravaged two-thirds of Russia and much of E. and Central Europe down to the conquest of the Byzantine empire. They also invaded Asia Minor, and as rulers or soldiers of fortune penetrated to N. Africa, bringing with them first the Buddhist, and secondly the Mahomedan, religion. Mediterranean and Nordic Europe only began to make headway against this latest Mongol invasion about the 17th century.

In the 19th century, however, after having laid the foundations of a white man's America, the Nordic and Mediterranean Europeans commenced their last tremendous expansion of power and colonisation. They discovered and colonised nearly all Australasia. They dominate all but E. Asia to-day. They conquered and took under control the whole of Africa, wherein also they planted prosperous colonies of white people. In the Old World and the New they are the ruling type. Whether they will remain so must depend on many factors: race fertility, conquest over disease and alcohol, education, reconciliation of ambitions, and international cooperation. Nature, however, is entirely without "pink and white" sympathies, and cares little for the skin colour of the coming super-man.

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**Ethyl.** Organic radical represented by the chemical formula  $C_2H_5$ . It has not been isolated, but its combinations, e.g. ethyl alcohol (ordinary alcohol) and many compounds, are well known. The name was introduced by Berzelius as Ethule. It is denoted by the contraction Et. Ethyl is a contraction of ether and *yl*, an abbreviation of Gr. *hyle*, material.

**Ethyl Alcohol** ( $C_2H_5O$ ). Chemical name for alcohol, the active principle of intoxicating liquors. It is also known as vinous alcohol or aqua vitae. See Alcohol.

**Ethylamine.** Organic base with an ammoniacal odour, burning taste, and strong alkaline character. It is liquid, behaves in most respects like ammonia, and is used in the manufacture of some aniline dyes. First prepared by Wurtz, 1848, by distilling cyanic ether with caustic potash, ethylamine is now made by Hofmann's process, in which crude ethyl chloride, a by-product in the manufacture of chloral, is acted on by ammonia. This produces diethyloxamide, which, purified and distilled with caustic potash, yields ethylamine.

**Ethyl Chloride** OR MONOCHLOR-ETHANE ( $C_2H_5Cl$ ). Etheral liquid known to the alchemists as sweet spirit of salt. It is made by passing hydrochloric acid gas into absolute alcohol containing zinc chloride, and distilling the product. Ethyl chloride is a volatile liquid, used as a solvent, and as a local and general anaesthetic.

**Ethylene** ( $C_2H_4$ ). Colourless gas prepared by the action of sulphuric acid on alcohol, and purified by passing through sulphuric acid and caustic soda. It was first investigated, 1781, by the Dutch chemists, Deimann, Paets van Troostwyk, Bondt, and Lauwerenburgh. It is also known as heavy carburetted hydrogen, elayl, and ethene. It is easily inflammable, burns with a luminous flame, and forms an explosive mixture with air or oxygen.

**Ethyl-hydrocupreine.** A derivative of cupreine, an alkaloid occurring in cuprea bark (*Remijia pedunculata*). Known also as optochin, it has been used in treating pneumonia, but is a dangerous drug.

**Ethyl Nitrite.** A solution containing 3 p.c. of ethyl nitrite, by weight, with 95 parts of absolute alcohol and five parts of glycerine. It forms the *Liquor Ethyl Nitritus* of the British Pharmacopoeia. It causes the small blood-vessels of the skin to dilate, the face to flush, and the heart to beat rapidly and violently, and relieves the pain of heart affections. The dose is from 15 to 60 minims.



Etna. The snowcapped volcano seen from Taormina, the beautiful Sicilian coast town on the Straits of Messina

**Etienne, EUGÈNE** (b. 1844). French politician. Born at Oran, Dec. 15, 1844, he was educated at



Eugène Etienne,  
French politician  
Manuel

Algers. He became deputy for Oran in 1881; under-secretary for the colonies, 1887, 1889, and 1892; minister of the interior, 1905, and of war, 1905-6, and 1913. He was also elected vice-president of the chamber of deputies in 1913 and again in 1914.

**Etymology** OR **AETIOLOGY** (Gr. *aitia*, cause; *logos*, account). The doctrine of causes, of the origin of things, specially applied to the origin of diseases. By some it is classed with ontology and teleology, as a branch of metaphysics (*q.v.*).

**Etiquette.** French word introduced into English to denote a routine of behaviour established by custom. It includes court ceremonial, formalities of diplomatic intercourse, procedure in parliament, in the army and navy, etc.; rules of behaviour in social intercourse; and the code observed by professional men, especially doctors and lawyers, for safeguarding the dignity and interests of their profession.

Of all peoples the Chinese attach the greatest importance to etiquette. From remote times they have codified their ceremonial, and the Book of Rites, though relatively modern, dates from the 1st century B.C. See *Manners*.

**Etive.** River and sea-loch of Argyllshire, Scotland. The river issues from Loch Mathair Etive and flows 15 m. S.W. to the head of Loch Etive. The loch extends 10½ m. S.W. and then 8½ m. W. to the Firth of Lorne. There are interesting ruins on its shores. The river is noted for its salmon and trout. *Pron.* Et-iv. See *illus.* p. 2730.

**Etna** (Lat. *Aetna*; Sicil. *Monte Gibello*). Active volcano, situated near the E. coast of Sicily, and the loftiest in Europe. Its present alt., 10,755 ft., shows a decrease of 115 ft. since 1861. The base covers an area of about 460 sq. m., and has a circumference of 90 m., while the floor of the crater, which constantly alters and has become wider in recent years, is 9,765 ft. above sea level. In the distance Etna presents the appearance of a huge symmetrical cone, but on closer observation discloses an irregular surface, studded with some 200 minor cones, attaining 3,000 ft. in height, and broken on the E. side by the Valle del Bove, a gaping abyss from 2,000 to 4,000 ft. deep. Its slope comprises three distinct zones of vegetation. The lower, or lava, region rises 3,000 ft. from the base, and is thickly populated and well cultivated; the middle, or wooded, region, between 3,000 ft. and 6,850 ft., is covered with forests of pines, birches, and other trees; the upper, or desert, zone is a barren waste, under snow during most of the year.

The ascent is generally made from Catania or Nicolosi, and 1,100 ft. from the summit is an observatory, with accommodation for tourists. Pindar describes an outbreak in 476 B.C. Violent explo-

sions occurred in 1169, 1527, 1669, 1693, 1792, 1830, 1852, 1865, 1879, 1886, 1892 (when a new crater was formed near Monte Gemellaro), 1899, and 1910. The eruption of 1169 partly destroyed Catania, and that of 1693 caused enormous loss of life. Of over 80 recorded activities, the most recent took place in May, 1914. Ancient legend connects the volcano with the giant Typhōn, who is said to have been buried beneath it by Zeus, and to have caused its eruptions by his heavy breathing; and with the workshops of Hephaestus (Vulcan), wherein the Cyclopes fabricated thunderbolts.

**Eton.** Town and parish of Buckinghamshire, England. On the left bank of the Thames, opposite Windsor, of the parl. bor. of which it forms part, it is 21 m. W.S.W. from London. Dating from Anglo-Saxon times, it has a church in Early Decorated style dedicated to S. John the Evangelist, 1852-54, and a noted inn, the Christopher. Pop. 3,300. See *Old Days of Eton Parish*, J. Shephard, 1908.

**Eton College.** English public school. Founded by Henry VI as the College of the Blessed Marie of Eton beside Windsor, and now known as the King's College of Our Lady beside Windsor, its first charter is dated Sept. 12, 1440. A supplementary charter was granted in 1441, when the buildings, completed 1553, were begun. The constitution (based upon that of Winchester, 1382) provided for a provost, head master, 10 priests, 4 clerks, 6 choristers, 25 poor scholars and 25 bedesmen. Henry Sever was the first provost, succeeded by William of Waynflete, 1443. Among the heads have been Nicholas Udall, 1504-66, John Keate, the famous flogger, 1773-1852, J. J. Hornby, 1826-1909, and Edmond Warre (*q.v.*). Arms were granted to the College in 1448.



Eton College arms

The founder's statutes were formally repealed in 1872. The foundation now consists of the provost, appointed by the crown, 10 fellows, who form the nominal governing body, vice-provost, head and lower



Etive. The Argyllshire loch, famous for its salmon and trout fishing



Eton. The town viewed from Windsor. In the centre is seen the college chapel, built by Henry VI

masters, one or more bursars, and two chaplains or conducts. The number of collegers (or Tugs) is 70. In 1920, in addition to the college

stored in 1848-60. The old buildings, of dark red brick, with stone dressings and clustered chimney shafts, form three sides of a quad-

angle which is completed by the chapel. The library was built in 1729, and new buildings in 1844-46 and 1885-87. In athletics the wall game is



proper, there were 27 houses and over 1,100 king's scholars and oppidans or house residents. There are, in all, 65 masters. Notable scholars have included Bolingbroke, Boyle, Canning, Chatham, Fox, Gladstone, Gray, Hallam, Kinglake, Milman, Peel, Porson, Pusey, Shelley, Swinburne, and Wellington, whose remark that Waterloo was won on the playing-fields of Eton has been explained as a reference to the fights that took place there.

In the Great War about 5,000 Etonians served and over 1,100 were killed. The restoration of the vestry chapel, a register in a Golden Book of the names of all who served, and a statue in the playing-fields constitute the proposed war memorial. In addition Etonians undertook to help to rebuild the French village of Eton, destroyed in the early days of the war.

Of the buildings, the hall, 1448, restored 1858, is the only part built according to the founder's final plan. The Gothic chapel, 1442-80, originally parochial as well as collegiate, resembles that of King's College, Cambridge, and was re-



a special feature, and the rowing boys are known as "wet bobs," the cricketers as "dry bobs." The school gives its name to the familiar short jae ket worn by boys.

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**Étourdi, L';** OR LES CONTRE-TEMPS (The Thoughtless, or The Mishaps). Five-act comedy by Molière, adapted from Italian sources. The scene is laid in Messina. The title refers to the character Léliu, who is often doing the wrong thing from right motives. His rascally servant Mascarille, a character played by Molière, is the life and soul of the play, which was first produced at Lyons, 1653.

**Étretat.** Town and watering-place of Normandy, France, in the dept. of Seine Inférieure. Facing the English Channel, 16 m. N.N.E. of Havre, it became a popular holiday resort in the latter part of the 19th century. The chief building is the Romanesque church of Notre Dame, dating in part from the 11th century. There are public gardens, a casino, and ample bathing facilities. Pop. 1,973.

**Etrich Taube.** Type of aeroplane (*q.v.*) developed by Igo Etrich in Austria. It was one of the early types with a large degree of inherent stability, due chiefly to the form of its wing. Each wing was swept backward and upwards towards the outer extremity like a bird's wing. The type was copied

by many German and Austrian constructors, and from the wing form became known as Taube or dove.

**Etruria** (Gr. *Tyrrhēnia*). Ancient district of Italy nearly corresponding to the modern Tuscany. To what race its inhabitants, variously called



Eton College. 1. The School Yard and Lupton's Tower, built in the 16th century. 2. The Upper School, built 1690-91. 3. The Hall, one of the original buildings of Henry VI, restored in 1858

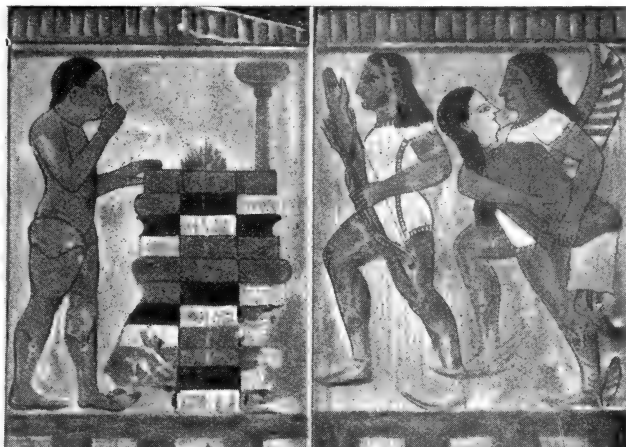
Tusci, Etrusci, or Rasenae, and their language belonged are problems yet unsolved. They were a warlike and enterprising people, whose power, at its height during the 7th century B.C., began to decline two centuries later. The chief authority was in the hands of an aristocratic caste called *lucumones*; the 12 principal cities were confederated, with a general council controlling matters of peace and war. They early came into contact with Rome, whose Tarquin kings were of Etruscan origin, and in 285 finally submitted to her yoke.

There is abundant archaeological evidence that the Etruscans were a wealthy, highly civilized people. Although their architecture was mainly borrowed from Greece and the East, it exhibits a certain originality. Above all, they were the first to make practical use of the principle of the arch, as in the bridges at Chiusi (*q.v.*). Their walls, unattached by cement, consisted of large blocks of stone, sometimes rectangular, sometimes roughly hewn. The Servian wall at Rome was of Etruscan construction. The tombs, all subterranean, differ according to periods and the condition of the soil. In mountainous districts they were usually chambers hewn out of the rock. Where the soil was yielding and crumbly they took the form of a *tumulus*, a conical earth-mound erected on a walled substructure, frequently having a pear-shaped ornamental top, *e.g.* the so-called tomb of the Horatii and Curiatii at Rome. The walls of the grave chambers were often adorned with paintings.

In their plastic arts, three stages have been distinguished—Egyptian, Etruscan, and Hellenic. Special excellence was shown in the preparation of clay vessels adapted from Greek models, cinerary urns, and terra-cotta sarcophagi. Numerous specimens are extant of statues, from tiny *lares* (household gods) to colossal figures, such as the she-wolf of the Capitol; and of all kinds of vessels, candelabra, silver goblets, ivory, gold, and silver thrones, and ornamented weapons. Most of the sculpture is sepulchral.

It is perhaps in painting that the Etruscans achieved the greatest success, whether on the walls of the sepulchral chambers or on pottery. The painted vases also passed through the three stages of Egyptian (or perhaps archaic Greek), Etruscan, and Hellenic. In the first the figures are of a blackish brown, in the second black, in both cases painted on the yellowish-red ground of the clay; in the third, the ground is black, the figures red.

The Etruscan mirrors are well



**Etruria.** Paintings discovered at Cervetri, the ancient Etruscan city of Caere, illustrating the ceremonial burning of the dead

*By courtesy of Wm. Heinemann*

known—round or pear-shaped plates of bronze, the outer side polished and the inner adorned with figures. Some of them are very beautiful and more than anything else throw light on the national life. The Etruscans were skilled musicians, their national instrument being the flute. *See* Archaeology; consult also Manuel d'archéologie étrusque et romaine, Jules Marthas, 1884; Cities and Cemeteries of Etruria, G. Dennis, ed. W. M. Lindsay, 1907.

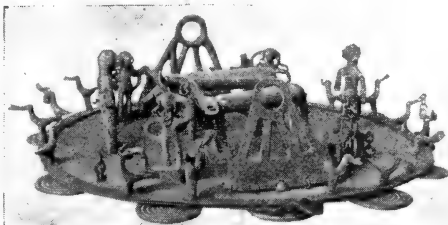
**Etruria.** Ecclesiastical district and village of Staffordshire, England. It is within the bor. of Stoke, with a station on the N. Staffordshire Rly. Josiah Wedgwood established his pottery works here in 1769. Etruria Hall, where Wedgwood died in 1795, has been converted into the offices of a large iron, steel, and coal works. Pop. 8,056. *See* Burslem.

**Etruria Marls.** In geology, beds of red and purple marl and clay, occurring in the upper coal measure strata of the coal-basins of the Midlands and N. of England. They are used in pottery manufacture. *See* Pottery.

**Ettlingen.** Town of Baden, Germany. It stands on the Alb, 4 m. S. of Karlsruhe. The chief buildings are a castle, standing in large grounds, the town hall, several churches, and a monastery, now put to secular uses. It is still surrounded by walls and a moat. Its industries include the manufac-

ture of paper, dating from before 1500, textiles of various kinds, and machinery. A Roman station, Ettlingen was made a town in 1227 and has since been part of Baden. It is famous for the battle fought here between the French and the Austrians, July 9-10, 1796, the French being the victors. Pop. 9,400.

**Ettmüller,** ERNST MORITZ LUDWIG (1802-77). German philologist. Born at Gersdorf, Saxony, Oct. 5, 1802, he became professor of Ger-



**Etruria.** Plate of primitive Etruscan work ornamented with figures depicting a ploughing scene

*British Museum*

man literature at the Zürich Gymnasium, 1833, and professor at the university there, 1863. His writings contributed largely to the knowledge of early German, Anglo-Saxon, and Scandinavian literatures. His best known works are a translation of Beowulf, 1840, and a Lexicon Anglo-Saxonicum, 1851. He died April 15, 1877.

**Ettrick Forest.** District of Selkirkshire, Scotland. Formerly a part of the Caledonian Forest which comprised Selkirkshire and portions of Peeblesshire and Midlothian, it was at one time a hunting ground of the Scottish kings. It is now almost denuded of its trees.

**Ettrick Water.** River of Selkirkshire, Scotland. It rises in Ettrick Pen and flows 32 m. N.E. to the Tweed, about 2 m. below Selkirk. In the churchyard of Ettrick parish are buried James Hogg, the "Ettrick shepherd," Thomas Boston (1677-1732), the Puritan divine and author, and Tibbie (Elizabeth) Shiel (1782-1878), who kept the famous inn at the head of St. Mary's Loch.

**Etty, WILLIAM** (1787-1849). English painter. Born in York, March 12, 1787, he was apprenticed to a



*Wm Etty*

From a photo, 1849

printer in Hull. Coming to London he began copying famous pictures. In 1806 he entered the Royal Academy schools and was for a year a pupil of Sir Thomas Lawrence. Between 1816-24 he made several visits to the Continent, chiefly to Italy, whence he returned with a fine sense of colour and of graceful composition. In 1824 he was elected A.R.A., and R.A. in 1828. He died in York, Nov. 13, 1849. Not until late in life did he obtain good prices for his work, probably owing to his preference for vast canvases. Of his smaller pictures *Youth on the Prow* and *Pleasure at the Helm* at the National Gallery is the most popular. The nobility and dignity of his huge works, such as *The Combat* and the three *Judith* pictures at Edinburgh, and *Ulysses* and the *Sirens* in the Royal Institution, Manchester, compel admiration. See *Life*, A. Gilchrist, 1855.

**Etymology** (Gr. *etymon*, true; *logos*, science). The investigation of the origin and meaning of words. The term dates back to the early schools of Greek philosophy, whose theories are ridiculed by Plato in the *Cratylus*, where he himself propounds some extraordinary derivations. The Stoics and Alexandrian grammarians also devoted much attention to the study of words and the parts of speech. Owing to complete ignorance of phonetic laws, the older etymologists laid down arbitrary and impossible sound changes, and even went so far as to derive words from others of opposite meaning, e.g. *lucus* (grove), a *non lucendo* (from not shining). In the Middle Ages the influence of theology led to the attempt to derive everything from Hebrew as the parent of all languages.

Etymology as a science is of comparatively recent origin, and became possible with the introduction of a knowledge of Sanskrit into Europe by Sir William Jones. This led to a thorough examination of the vocabulary of the Indo-European languages and the establishment of certain fixed principles of sound-change which governed the changes in the form of a word in different languages.

What is called popular etymology is really false analogy, and is an endeavour to adapt the form of a word not directly intelligible to that of one more familiar and apparently related; for example, *crawfish* (French *écrevisse*), *wormwood* (German *Wermuth*), *bridegroom* (A.S. *brideguma*, *brideman*), *Charterhouse* (*Chartreux*). See *Language*; *Place Names*.

**Eu.** Town of Normandy, France, in the dept. of Seine Inférieure. It stands on the Bresle, 64 m. N.E. of Rouen. It has a few industries, flour mills, brickyards, and glass works among them, and a transit trade, but its main interest is historical. The church of S. Lawrence is a fine Gothic building of the 12th and 13th centuries, and the château, partly burned down in 1902, dates from the 16th century, when it replaced an older one. Louis Philippe, who restored it, often resided here. Pop. 4,900.

**Eua** or **EOA.** Island of the Tonga group in lat. 21°24'S. and long. 174°50' W. Densely populated, it is 10 m. long, 3 m. broad, and has an area of 67 sq. m. It is mountainous, well watered, and fertile.

**Euboea** (Turk. *Egripo*; Ital. *Negroponte*). Large island of Greece, in the Aegean Sea. It lies off the E. coasts of Boeotia and Attica, has a length of 115 m., a breadth varying from 4 m. to 32 m. and is separated from the mainland by a narrow channel called Euripus. The surface is mountainous with fertile valleys, pasturing large herds of cattle. Oil,



Eucharis. Foliage and flowers of *Eucharis Amazonica*, a S. American bulbous herb

wine, corn, fruit, honey, and pitch are produced, but stock-breeding is the principal occupation. The highest point is Mt. Delphi, 5,720 ft. Its thermal springs have been esteemed since ancient times. The chief town is Chalcis. Its history is merged in that of Greece and Rome. In medieval times it belonged to Venice. It was taken by the Turks in 1470, and in 1830 was restored to Greece. Area 1,430 sq. m. Pop. 116,903. *Pron.* Ev-via.

**Eubulus** (d. 330 B.C.). Greek orator and demagogue. He was a friend of Aeschines, whose clerk he had been, and a violent opponent of Demosthenes. It was chiefly owing to him that Aeschines was acquitted when accused of treacherous dealings with Philip of Macedon. A decided pacifist, Eubulus carried a proposal that whoever suggested applying any portion of the theoric or festival fund to any other purpose, such as war, should be put to death. In 346 B.C., negotiating with Philip, he concluded a peace highly disadvantageous to Athens.

**Eucaine** (Gr. *eu*, well; and *cocaine*). Artificially prepared alkaloid allied to cocaine. It is used as a local anaesthetic in small operations and extraction of teeth. It is safer than cocaine, but is not so powerful.

**Eucalyptus** (Gr. *eu*, well; *kalyp-tos*, covered). Genus of trees of the natural order Myrtaceae. The name is given to it because the petals cover thoroughly the unexpanded flowers. See *Gum Trees*.

**Eucalyptus Gum.** Exudate of the red gum-tree of Australia. It contains tannic acid and is a powerful astringent, being used in lozenges or in gargles for relaxed throat, and occasionally prescribed in diarrhoea and dysentery. Eucalyptus oil is distilled from the *eucalyptus globulus*, the blue gum-tree. It is used as an antiseptic, and as an inhalation or spray in conditions accompanied by foetid expectoration.

**Eucasin** or **CASEIN AMMONIA** (Lat. *caseus*, cheese). Soluble form of casein. It is prepared by passing ammonia gas over casein, or into a suspension of casein in alcohol or ether. It is used as a food.

**Eucharis** (Gr. *eucharis*, pleasing). Small genus of bulbous herbs of the natural order Amaryllidaceae. Natives of New Granada, they have egg-shaped bulbs, broad, elliptical leaves with long stalks, and white flowers, from 3 ins. to 5 ins. across. These are borne in clusters on top of a tall stem, and consist of a slender tube expanding into a cup, surrounded by six sepals and petals.



**Eucharist** (Gr. *eucharistia*, thanksgiving). One of the names used from early times for the Sacrament of the Lord's Supper. The term occurs frequently in the N.T. in the general sense of thanksgiving, but for the most part without special reference to the Lord's Supper or Holy Communion. The special application of the word arose from the Gospel accounts of the Supper, in which Christ is recorded to have given thanks over both the bread and the cup. The Apostles followed His example, and thus the blessing or consecration of the elements became known as a eucharist or thanksgiving. Later the

tions prefer the primitive name of the Lord's Supper.

As the central act of worship, the Eucharist has been the cause of much embittered controversy. The history of Eucharistic doctrine exhibits two main points at issue: (1) the nature and method of the presence of Christ in, or associated with, the consecrated elements; (2) the sacrificial aspect of the service. From comparatively early times it was held that after the act of consecration, the Body and Blood of Christ are really and substantially present, and "are verily and indeed taken and received by the faithful in the Lord's Supper."

But in defining the method of the mysterious Presence, wide differences of opinion arose.

Throughout the Western Church the doctrine of Transubstantiation became, in the course of time, a matter of faith. This taught that the substance of the elements was changed into or replaced by that of the Body and Blood of Christ, so that only the accidents or appearance of the bread and wine remain. Consubstantiation taught that both substances are present as a compound substance. At the Reformation, Transubstantiation was generally abandoned by Protest-

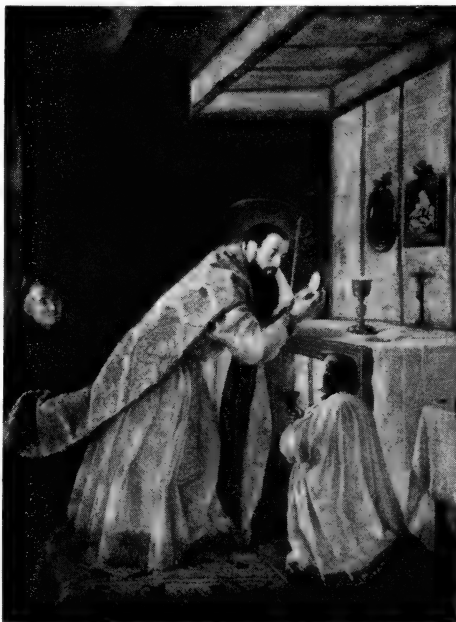
of the sacrifice of Christ on Calvary, but not a repetition of it. The various Protestant churches altogether reject the sacrificial idea.

In primitive times the Eucharist was celebrated in the evening, but from the time of Trajan it began to be a morning service. This practice has prevailed ever since, except in the Free Churches, and is connected with the ancient custom of receiving the Communion fasting. At first the celebration of the Eucharist followed the Agape (*q.v.*) or common meal, and was probably held daily. Later on the two were separated, and as a rule the Communion service was held on Sundays and Festival days. There is evidence that in some of the larger churches daily celebrations took place, but this was not the general custom. Originally all the faithful communicated at each celebration, the catechumens, penitents, and strangers withdrawing before the consecration; but as the sacrificial aspect became emphasised, the practice of non-communicating attendance became common, all the faithful attending each service, but only communicating occasionally or on obligatory feasts.

Except the Church of Rome, all Churches from Apostolic days have given Communion to the people in both kinds. In the Roman Church the cup has not been given to the laity through fear of accidents since the 14th century; while in the Greek Church the consecrated bread is dipped in the cup, and the elements are thus given together. Throughout the Western Church unleavened bread has been used; but this practice has not been adopted by the Eastern Churches. In the Anglican Church either kind of bread is permissible. The practice of adding water to the wine is general, except in Protestant churches, on the ground that the cup was thus mixed at the Passover.

The reception of Holy Communion is a condition of membership throughout the Christian Church. The Roman Church requires at least one annual participation at Easter; the Anglican Church fixes three times a year, Easter to be one, as the minimum. See Communion; Consubstantiation; Mass; Real Presence; Sacrament; Transubstantiation; also *illus.* p. 1892

**Euchlorine** ( $\text{ClO}_2$ ). Yellow gas formed when potassium chlorate is treated with hydrochloric acid. First prepared by Davy, in 1815, it was thought to be a new oxide of chlorine, but is merely a mixture of chlorine and chlorine peroxide. An efficient disinfectant, it is sometimes used instead of chlorine.



Eucharist. S. Benedict celebrating Mass, from the painting by Sebastiano Ricci (1662-1734) in the academy of S. Fernando, Madrid

consecrated elements themselves became known as eucharistia, and the service itself was called the Eucharist, as being the Christian sacrifice or offering of thanksgiving and praise.

The Eucharist is the act of united worship directly commanded by Christ Himself in the words, "Do this in remembrance of Me." It has always been the central act of Christian worship in all the churches, save in a few bodies, such as the Quakers and the Salvation Army. In the early Church it was commonly called the Oblation or Liturgy, as it is still in the Eastern Churches. The Roman Church styles it the Mass, the Anglican Church Holy Communion, while most of the Protestant denomina-

ant bodies; but no one theory took its place. The Lutheran view was nearly identical with Consubstantiation; the Anglican Church maintained the Real Presence, but without defining its method; and most other reformed churches adopted the view of Calvin that there is no Real Presence in the elements themselves, but simply a spiritual presence of Christ in the souls of the faithful.

As regards the sacrificial aspect, the Roman Church teaches that in the Eucharist there is a "true and proper" sacrifice of Christ, Who is offered to the Father as a propitiation for both living and departed. The Eastern and Anglican Churches recognize a perpetual memorial or pleading before God

**Euchre.** A card game. It is played with 32 cards, the 2, 3, 4, 5, and 6 of each suit being thrown out. There are two players, or four in partnership. The dealer gives five cards to each player, three at a time and then two, turning up the next face upwards on the pack for trumps. In the trump suit the knave, the "right Bower," is highest, the other knave of the same colour coming next, the "left Bower." The remaining cards of the trump suit, and those of the other three, rank from ace to seven.

In the two-handed game the non-dealer begins by deciding whether he shall play or pass. If satisfied that he can win the odd trick he says, "Order it up." His opponent then puts one card face downwards on the table and is entitled to the card turned up for trumps, but generally leaves this card until he wishes to play it. Should the non-dealer be dissatisfied, he passes; the dealer may then either take up the top card in exchange for one of his own, and play, or he may pass also. Both having passed in turn, either player has the chance of going on any other suit he chooses to make trumps. If both pass again, the hands are thrown up.

Two cards constitute a trick. A player must follow suit if he can, but need not take a trick unless a higher card is his only play in that suit. The game is five up. If the player ordering up succeeds in making five tricks he wins a *march*, and scores two points; if three tricks, he makes the point, and scores 1 (four tricks count for no more than three). If he fails to make three tricks he is euchred, and his opponent scores 2.

There is a variant of the game, called cut-throat euchre, for three players. *Pron.* U-ker. *See* The Standard Hoyle, 1887.

**Eucken, RUDOLF CHRISTOPH** (b. 1846). German theologian and philosophical writer. Born Jan. 5,



Rudolf Eucken,  
German theologian

1846, in E. Friesland, he was educated at Göttingen and Berlin. He was professor of philosophy in the university of Basel from 1871 to 1874, when he accepted a

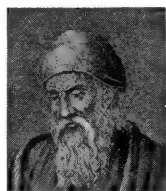
similar post at Jena. His views and writings show the influence of Plato and the elder Fichte. He upholds the Christian standpoint, and is the opponent of naturalism in all its forms, whether as empiricism, positivism, or utilitarianism.

His chief works translated into English are: *The Fundamental Concepts of Modern Philosophic Thought*, critically and historically considered, 1880; *The Problem of Human Life as viewed by Great Thinkers*, 1909; *The Meaning and Value of Life*, 1909; *Christianity and the New Idealism*, 1909.

**Eucila.** Township of W. Australia. It stands at the head of the Great Australian Bight near the S. Australian border, on the overland telegraph route through W. and S. Australia.

**Eucrase** (Gr. *eu*, well; *klasis*, breaking). Rare mineral consisting of hydrated silicate of beryllium and alumina. Occurring in short prisms, with vertical striae on crystal faces, it is either colourless, yellowish, green, or blue. It is found in Minas Geraes, Brazil, in the Ural mts. and Austrian Alps.

**Euclides** (fl. 300 B.C.). Greek mathematician, whose more familiar name is Euclid. Little is



Euclides,  
Greek mathematician

known of his life except that he was of Greek descent, and lived and taught at Alexandria. His individuality has indeed been so merged in his works that medieval writers attempted to prove that he never existed. Besides the *Elements* of Geometry, Euclid wrote *De Divisionibus*, a collection of 36 problems on the division of areas, possibly the only survivor of many such collections.

**Euclides** (5th cent. B.C.). Greek philosopher. A native of Megara, he founded the Megarian school, one of the so-called imperfect Socratic philosophical schools. He held that there was only one good (Reason, Truth), and only one virtue (a knowledge of this good), all else being non-existent—a Socratic modification of the Eleatic doctrine of the Absolute One.

**Euclid.** Text-book on the elements of geometry, based upon the work of Euclides (*q.v.*). The course in elementary mathematics in vogue during the latter portion of the last century unwittingly introduced the student to a set of brilliant exercises in deductive logic in the guise of Euclid as an introduction to geometry. Many pupils never surmounted the *Pons Asinorum* (Euclid I), others managed by a sheer exercise of memory to master Euclid Bk. I, but only the comparatively select few succeeded in

enjoying Euclid Bks. I to IV. As a school text-book in the days of dull drill and lengthy routine, Euclid was admirable. The propositions supplied material for the dullard, and the hosts of exercises kept the keener intellects busy.

Euclid has been discarded by schools mainly for two important reasons: it is unsuitable to students of school age because it is entirely deductive; it is almost valueless as an introduction to geometry because it takes no note of modern ideas. Measurement and constructive movement are dominant in modern life, and Euclid ignores both. *See* Geometry; Mathematics.

**Eucomis.** Small genus of perennial bulbous herbs of the natural order Liliaceae. They are natives of the Cape of Good Hope. They have broad lance-shaped or oblong leaves, and a stout, leafless flower-stem, the upper half crowded with greenish brown flowers, and surmounted by a small tuft of leaf-like bracts.

**Eucrite.** Crystalline granular rock, a variety of gabbro. It is characterised by the presence, among mineral constituents, of basic species of feldspar. It is well developed in Tertiary eruptive rock in the Isle of Rum and near Carlingford, Ireland.

**Eudaemonism** (Gr. *eudaimonismos*). Greek term for the theory that happiness (*eudaimonia*) is the chief end of life. This happiness, according to Aristotle, must be striven after for its own sake, not as a means to an end, and is defined by him as a perfect activity in a perfect life. The most excellent and specially human activity is that of the reason; happiness therefore is to be sought in a contemplative, otherwise a virtuous, life. Eudaemonism is to be distinguished from Hedonism (*q.v.*).

**Eudiometer** (Gr. *eudia*, fine weather; *metron*, measure). Instrument used for measuring gases. Originally designed for determining the amount of oxygen contained in a sample of air, it is now commonly used for determining the constituents of a gaseous mixture. In some forms it comprises a graduated glass tube or cylinder, either straight or U-shaped, closed up at one end and open at the other, and having inverted near the closed end two platinum wires, which are near enough to allow the passage of an electric spark through the mixture.

A Cavendish eudiometer is a vessel closed at both ends, having a screwed connexion by which it can be pumped clear of air before being filled with a gaseous mixture

for analysis. A mixture of two volumes of hydrogen and one of oxygen can be exploded in a eudiometer tube to form water.

**Eudocia** (c. 393-460). East Roman empress. Daughter of the Athenian philosopher Leontius, celebrated for her beauty and intellect, she was converted to Christianity by Pulcheria, sister of Theodosius II who married her in 421. Before conversion her name was Athenais. The two sisters-in-law, however, quarrelled over the Eutychoian heresy (see Eutyches), and Eudocia was banished, returning to a life of good works at Jerusalem. She wrote several poems, chiefly of a religious nature.

**Euganean Hills.** Isolated group of hills of N.E. Italy, in the prov. of Padua. Lying in the W. of the prov. they are of volcanic origin, have numerous thermal springs, and extensive trachyte quarries. The loftiest point is Monte Venda, 1,895 ft. On their slopes are several villas and a ruined convent.

**Eugene.** City of Oregon, U.S.A. the co. seat of Lane co. It stands on the Willamette river, 46 m. S. of Padua. Lying in the W. of the prov. it is served by the S. Pacific rly. It is the seat of the Oregon university (opened 1876). It has machine shops, ironfounding and tanning industries, and manufactures of furniture, cotton goods, window-sashes and doors. Eugene is at the head of navigation, and carries on a brisk trade in lumber, cereals, cattle and animal products and canned fruit. It is a rapidly growing city, settled in 1854, and incorporated 10 years later. Pop. 14,257.

**Eugene** (1663-1736). Italian prince and Austrian soldier. Born in Paris, Oct. 18, 1663, his father was Eugene Maurice, prince of Savoy, and his mother a Frenchwoman, a niece of Mazarin. He was baptized as François Eugene. Educated in France, at first for the church, he entered the Austrian army, as Louis would not admit him to the French, a fact which some think gave a distinct anti-French impetus to his military career. His early experiences were gained fighting against the Turks, and his advance was rapid.

In 1691 Eugene held a command in Italy, where, between then and 1693, he won several successes over the French. In 1697, in command of the im-

perialists in Hungary, he crushed the Turks at Zenta. In 1701, when the war of the Spanish succession broke out, he was sent to Italy, where again he won considerable successes over the French. In 1704 began the association with Marlborough which has linked together the two names in history. The prince helped in the battle of Blenheim, but when Ramillies was fought (1706) he was again in Italy, where his outstanding feat was the capture of Turin. He fought at Oudenarde, but after the English had withdrawn from the struggle, he advised his master, the emperor, to do the same. This counsel being taken, he arranged in 1714 the peace of Rastatt.

Next began one of Eugene's greatest campaigns, the one that made him the idol of the Austrians. In the war against the Turks that opened in 1716, he won a victory at Peterwardein, and a greater one when he captured Belgrade. A period of peace fol-

lowed, the prince serving as governor for the Netherlands, and then as the emperor's representative in Italy. In 1734 he led the Austrians in the war of the Polish succession, and on April 21, 1736, he died in Vienna.

The greatest of all the soldiers who have served Austria, Eugene was responsible for the only period in her military history that can be called glorious. He had a passion for war, the genius that knew instinctively when risks could be taken, for several of his victories were won over greatly superior forces. He was interested in art, and left a magnificent collection of pictures. The prince never married. See Life, G. B. Malleon, 1888.

**Eugene Aram.** Poem by Thomas Hood, The Dream of Eugene Aram, published in The Gem in 1829; and romance by Lord Lytton, published anonymously in 1832. Both are based on the history of a schoolmaster of that name. See Aram, Eugene.

## EUGENICS: THE SCIENCE OF BREEDING

J. Arthur Thomson, Prof. of Natural History, Aberdeen

*The attention given by modern scientific students to this subject justifies the following article, which should be read those on Biology; Heredity; Life. See also Birth Rate; Death Rate; Population.*

Eugenics (Gr. *eugenēs*, well born) is defined by Sir Francis Galton as "the study of agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally." It is based on what is known of heredity and other factors affecting the organic welfare of the human stock. Its primary reference is to the inborn qualities of the race, considered as a breed. In plain words, eugenics is the art of breeding well. But it is artificial to consider a living creature apart from its surroundings and activities, so that eugenics must be supplemented by a study of environment and function.

For the combined influences of environment and function, Galton used the term nurture, opposing it, as Shakespeare did in The Tempest, to the inborn or inherited nature, and it has been much discussed whether nature or nurture is the more important. But nature and nurture are complementary, not antithetic. If a good inheritance is to develop fully it must have an appropriate nurture, which liberates the possibilities that might otherwise remain undeveloped. Good nurture develops the good, and inhibits the bad elements in an inheritance. Bad nurture stimulates evil predispositions and hinders the emergence of the good. Thus euge-

nics cannot be separated from nurture, and this commonsense conclusion is the more important since nurture is more in man's control than the inheritance can ever be.

The fundamental fact of eugenics is that the chief determining factor of human life is what the child is or has to start with, in virtue of its hereditary relation to parents and ancestry. The statistical inquiries of the workers in the Galton Eugenics Laboratory show the fundamental importance of natural inheritance. Exception may perhaps be taken to the form of the statement that "nature is five to ten times as influential as nurture," for no matter how fine the seed, it will not yield a rich crop without good soil and plenty of sunshine and rain; but it must be allowed that the fundamental determinant of racial welfare is heredity. This emphasis on the inherited nature has this further justification, that there is no secure warrant at present for believing that gains made by the individual as the direct results of beneficial nurture can be entailed on the offspring.

The peculiarities which are acquired by the individual's careful choice of surroundings do not seem to be transmitted as such to the next generation. This may sound discouraging, but three points must be noticed. (a) If the



Prince Eugene,  
Austrian soldier  
From a contemporary  
portrait

gains of good nurture are not handed on, neither are the losses due to deteriorative nurture. (b) The bodily and mental health of mothers, which depends in part on individual nurture, influences the general development of the unborn child, which lives in long antenatal partnership with her. Thus nurture indirectly affects the general vigour of the race. (c) The new departures in a race, known as variations or mutations (*see* Evolution), appear to be expressions of intrinsic changes in the constitution of the germ. In course of development these find expression, and they have to stand the criticism of everyday life. It is plain that a promising new departure, whether idiosyncrasy, originality, or genius, may be nipped in the bud without congenial nurture.

The results of nurture may thus prove of great importance as part of that social system which decides whether new departures are to survive or not. Promising novelties, which the eugenist regards as the raw materials of progress, the most precious things in life, may fail to persist, and the race is obviously the poorer if the clever artist or musician is starved into celibacy. Fortunately the same process may operate against the establishment of variations in vice or criminality.

The question arises how the intrinsic endowment can be practically controlled. To this it may be answered, that while men and women cannot select their parents, they can and do select their partners in life. This may operate, in the first place, negatively. There are unsound types of constitution who should not become parents, because by so doing they still further deteriorate the quality of the race. There are some types of constitutional disease, defect, or unsoundness which have peculiar staying power in inheritance, which sometimes behave as Mendelian characters. These should be allowed to die out.

#### Eugenics and Legislation

A character like colour-blindness, which usually passes from a father through an unaffected daughter to a grandson, is not of great moment, but no one can contemplate without grave regret the spoiling of a more or less sound stock by the introduction of predisposition to diabetes or S. Vitus's Dance, a well-defined mental instability, or a defect like deaf-mutism. How far eugenic legislation should go is a difficult question. It is certainly desirable to educate public opinion so as to form rational prejudices against the spoiling of approxi-

mately good stock by bad, strong by weakly, fine by poor. Without adopting drastic measures a nation might do much in the way of negative eugenics.

In some races, *e.g.* Jews and Chinese, the strong eugenic tradition has expressed itself in a pride in sustaining a vigorous, alert, wholesome lineage. Preoccupation with the struggle for wealth, selfish love of ease, and immoral gratifications of the sex-impulse tend to destroy pride in having a vigorous family. That many celibates are the salt of the earth does not dispose of the fact that there are selfish, we may almost say non-mammalian, forms of celibacy. A few social arrangements, *e.g.* in connexion with taxation, seek to lessen the difficulty of bringing up a family, and Galton contemplated the direct pecuniary encouragement of the early marriages of highly desirable members of the community.

#### Eugenic and Economic Ideals

It may be doubted, however, whether indirect encouragement is not much safer. A community which realizes the racial value of types with, let us say, high artistic gifts associated with health, will in its criticised expenditure tend to secure their continuance. The applications of this economic idea of "the criticism of consumption" are endless and far-reaching. All expenditure which promotes unhealthy rather than healthy occupations, which helps to multiply undesirable types, which makes for sweated labour and slums rather than for well-paid work and gardens, is necessarily dysgenic, and not eugenic. In many ways it will probably be found possible to combine eugenic and economic ideals by ceasing to penalise maternity.

When primitive man's mastery of nature was only beginning, there must have been an intense struggle for existence. The ranks were thinned by storm and flood, by famine and pestilence, by wild beasts and poisonous herbs. When the thinning was sifting, *i.e.* when those who survived did so in virtue of some quality, say of vigour or alertness, which those who perished lacked, then it was natural selection, and made for evolution. With the progress of civilization there has been a continual rebellion of men against the yoke of natural selection.

The growth of kin-sympathy and social solidarity has led to persistent endeavours to interfere with the crudity of natural selection, and to save the weak, the diseased, and the foolish. Here is a

dilemma where biological and social ideals are opposed. It is biologically unsound that the unhealthy and unstable should be allowed to multiply their kind, it is socially unsound that altruistic sympathies should be outraged. This dilemma still remains.

#### "Social Surgery"

The problem is to substitute for nature's régime, which man has in great part abolished, a process of rational selection which will sift out the tares from the wheat. The seriousness of the dilemma has led to proposals implying some measure of "social surgery." It has been suggested that obviously undesirable types who have fallen back upon the community for support should be prevented from reproducing their kind.

Objections against this are (1) that in some measure society may be responsible for the making of those absolute failures, and that their production as much as their reproduction should be stopped; (2) that measures of repression and segregation are repugnant to the social sentiments of freedom and solidarity. Some strong-minded counsellors, not lacking in humane feelings, have advised a return to "the purgation of the state" which Sparta to some extent practised and Plato approved. It has been suggested that weakly infants whose life must be more or less miserable should be allowed to pass away in their sleep. The gravest objections to this are: (1) that many weaklings have been makers and shakers of the world; (2) that the proposals outrun our present secure knowledge; (3) that it would remove the results of evil without touching the causes; and (4) that it outrages social sentiment in its finest expressions.

Another line seems at present safer and more promising, namely a criticism of the processes which thin the ranks of mankind. Some of these are more or less indiscriminate elimination, as microbic diseases like cholera. As such diseases do not select the weaker as their victims, leaving the stronger to survive, their reduction, much marked in modern times, is in a eugenic direction. A wasteful thinning of the population is avoided, and many fine lives, which might have been gratuitously sacrificed, are saved.

The reduction of infantile mortality, which has still a long way to go, must be approved by all eugenicists. Similarly, the reduction of infection by the tubercle bacillus operates against a profitless wastage of fine types. The case of syphilis is more difficult, since its curability may remove a deterrent from vice; but a consideration of the

poisoning of innocent mothers and the blinding of innocent children makes it clear that the curative treatment of the disease will operate eugenically.

In regard to war, it is generally agreed that a war may be socially and ethically inevitable and justifiable, though in itself a regrettable anachronism. But it is certain that a prolonged war in which a large proportion of the men of fighting age are engaged must have dysgenic consequences. On the whole, the best and the bravest will tend to be eliminated, and this means impoverishment of the stock. The costliness of war also operates dysgenically in diverting expenditure from the support of the more highly individualised and less readily replaceable members of the community.

This illustration of the dysgenic influence of war clearly points to two highly important considerations. First, that man's great problem is to substitute for dysgenic elimination eugenic selection, for indiscriminate thinning a discriminate sifting, for the cruder forms of natural selection the subtler forms of rational and social selection. Secondly, that it is absolutely vital for the student of human eugenics to bear in mind, what is to the breeder of other organisms irrelevant, that man is a rational, social personality. Man's mind to him a kingdom is, and not less important than the natural inheritance mysteriously transmitted in the vehicle of the germ-plasm is that external systematisation or registration of institutions and traditions, of literature and art, which form his social heritage.

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From a photo  
of 1860

*Eugénie*

**Eugénie** (1826–1920). Empress of the French. Born at Granada, Spain, May 5, 1826, the daughter of count de Montijo and Maria Manuele Kirkpatrick, whose Scottish father was U.S.A. consul at Malaga, she made her début in Paris society in 1851, where her beauty attracted Napoleon III, who married her, Jan. 30, 1853. The marriage created a great sensation, and the comparatively humble origin of the new empress made for many jealousies. Under her influence the court became a centre of luxury and extravagance.

In political affairs the empress exercised a strong, not always beneficial, influence upon Napoleon. She favoured the disastrous Mexican expedition of 1863–66, and, anxious to show her devotion to the Church, hindered the emperor's Italian policy until all his influence with the liberals was lost. At the outbreak of the Franco-Prussian War, 1870, into which she urged Napoleon in order to strengthen the dynasty for her son, she became regent when the emperor went to the front, but after Sedan fled to England, where she was joined by the emperor, 1871, and they settled at Chislehurst. Napoleon died in 1873; their only son, the Prince Imperial, was killed with the British army in the Zulu campaign in June, 1879.

Henceforward the empress lived in seclusion, her chief friend being Queen Victoria. She moved to Farnborough in 1887 and usually spent the winters in the S. of Europe, and died whilst on a visit to Spain, July 11, 1920. Her body

was brought to England and buried in the mausoleum with Napoleon III and her son, at Farnborough. See The Empress Eugénie and her Son, E. Legge, 1916; Memoirs, Comte Fleury, 1920.

**Eugenius.** Name of four popes, of whom two are notable. Eugenius III (d. 1153) was born at Pisa, where he was educated and ordained. He joined the Cistercian Order, came under the influence of Bernard of Clairvaux, and was made abbot of the monastery of Tre Fontane at Rome. His elevation to the papacy, 1145, coincided with a revolt against the temporal supremacy, and he was driven to Viterbo. The activities of Arnold of Brescia (*q.v.*) compelled him to leave Italy, 1146. During his two



Eugénie. From a photo of the empress taken in 1906

years in France he promoted the second crusade, and promulgated measures for the reform of the clergy. It was not until shortly before his death, July 8, 1153, that, thanks to the intervention of the emperor, Frederick Barbarossa, he was able to return to Rome.

Eugenius IV (d. 1447) was a Venetian and a monk of the Celestine order. He was bishop of Siena and became pope in 1431. He was first engaged in a struggle with the Colonna family, and then with the Council of Basel, which refused to dissolve on his order in 1431, the recalcitrants of the council declaring him suspended and deposed, and electing the anti-pope Amadeus of Savoy (Felix V). Outside a comparatively small party, however, Eugenius maintained his position as rightful pope. From 1433–53 he was driven to live at Florence by a revolt of the Romans. He effected a temporary union with the Greek and Armenian churches, 1439.



**Eugenol.** Chief constituent of clove oil. Obtained by distilling cloves, and from pimento-leaf oil, the oil contains from 80 to 90 p.c. of eugenol. It has the same spicy odour as clove oil, from which it is separated by caustic potash. Eugenol is used medicinally as a carminative, and frequently as a palliative in toothache, a pledge of cotton-wool wetted with eugenol being inserted into the hollow tooth. Commercially eugenol is of importance in the manufacture of vanillin.

**Eugubine Tables.** Seven large bronze tablets found in 1444 in a vault near Gubbio (ancient Iguvium, middle-age Eugubium), in central Italy. They are covered with inscriptions in Umbrian and Latin, one in both languages, in excellent preservation. The oldest date from 200 B.C. They embody almost all that is known of the Umbrian dialect and throw valuable light upon the religious customs of ancient Italy. The text contains the proceedings of a priestly corporation named the Attidian brothers, a code of religious ceremonies with directions for auguries, sacrifices, and expiatory ceremonies. See Inscriptions.

**Euhemerus** (4th century B.C.). Greek rationalist. A native of Messene in Sicily, and a follower of the Cyrenaic school, he lived at the court of Cassander, king of Macedonia. Euhemerus was the author of a Sacred Register, in which he tells how, having been sent by Cassander to the Indian Ocean, he landed in the mythical island of Panchaea. Here he discovered, inscribed on a golden pillar in a temple of Zeus, a history of the world, the study of which led him to the conclusion that the gods and heroes were nothing but supermen, on whom divine honours had been bestowed after death. Other Greek writers had already expressed similar views, but they were first systematised by Euhemerus, whose name and ideas survive in the modern term Euhemerism. His writings were translated into Latin by Ennius, and fathers of the church, such as Lactantius, made use of them as a source of arguments against paganism.

**Eulenburg, PHILIPP, PRINCE** (1847-1921). German diplomatist. Born at Königsberg, he served in the Franco-Prussian War, 1870, studied law from 1872-75, and then entered the diplomatic service. Prussian ambassador to Stuttgart, 1890, and Munich, 1891, he was imperial ambassador to Vienna from 1894-1902, when he retired owing to ill-health. In 1907 he was virulently attacked by Maximilian

Harden in his *Zukunft*. His reputation never recovered, and he died Sept. 16, 1921.

**Eulenspiegel, TYLL.** Name of a peasant to whom were ascribed the jests and practical jokes in a popular Low-German collection of the late 15th century (now lost). The High-German version, the basis of all subsequent editions, was printed in 1515. Eulenspiegel is supposed to have been an actual person, who died in 1350, and his traditional grave is shown at Mölln. His story was widely popular in Europe and in England, and is the basis of the well-known symphonic poem by Richard Strauss, 1895. See Tyll Owlglass.

**Euler, LEONARD** (1707-83). Swiss mathematician. Born at Basel, April 15, 1707, he became professor of mathematics at St. Petersburg, 1733, and at Berlin by Frederick II's invitation, 1741, returning to Russia in 1766. He died there Sept. 18, 1783. He was an accomplished mathematician and a prolific writer on the subject, doing valuable work in mathematical analysis, in revising and coordinating the existing branches of pure mathematics, and in a study of planetary motions.

**Eumaëus** (Gr. *Eumaios*). In Greek legend, the faithful swineherd of Odysseus, to whom his master revealed himself when he arrived in disguise in his native Ithaca after 20 years' absence. Eumaëus afterwards helped Odysseus to slay the suitors of Penelope (q.v.). Pron. U-mē-us.

**Eumenes OF CARDIA** (c. 360-316 B.C.). Private secretary to Philip of Macedon and Alexander the Great. He accompanied the latter on his Persian campaigns, and on Alexander's death, in 323 B.C., became ruler of Paphlagonia, Cappadocia, and Pontus. After a four years' struggle with Antigonus (q.v.), he was taken prisoner by the latter and put to death. See Craterus. Pron. U-men-eēz.

**Eumenes.** Name of two kings of Pergamum. Eumenes I reigned 263-241 B.C., but Eumenes II, who reigned 197-159 B.C., is the more important. Realizing that his interests lay in recognition of the power of the Romans, he entered into an alliance with them, assisted them in the war against Antiochus the Great, taking part in the battle of Magnesia, and was established by them as ruler of Mysia, Lydia, Phrygia, Lycæonia, and Pamphylia. His lukewarmness in the war against Perseus, king of Macedonia, caused him to be suspected of intriguing with the enemy, and he never completely regained Roman favour. Under his rule Pergamum

became a city of great magnificence. Eumenes founded a library said to rival that of Alexandria. See Pergamum.

**Eumenides OR ERINYES.** In Greek mythology, avenging deities who pursued those guilty of crime, especially crimes against the family and crimes of bloodshed. They are represented as winged women with snakes sprouting from their heads instead of hair, and bearing torches and scourges. They were three in number—Tisiphone (avenger), Alecto (unceasing, relentless), and Megæra (jealous). Erinyes was the older name, Eumenides (the kindly) being a euphemistic title, bestowed upon them after they had abandoned their persecution of Orestes. In Attica they were by preference called Semnai, the awful goddesses. They were propitiated by wineless libations of water, milk, and honey. Furiæ and Diræ were the Roman equivalents. Pron. U-meny-deez.

**Eumenides.** Tragedy by Aeschylus, last of the trilogy *Oresteia*. The subject is the trial of Orestes before the Areopagus (q.v.) for the murder of his mother, Clytemnestra. The Erinyes act as prosecutors, and Orestes, who is defended by Apollo, is acquitted by the casting vote of Athena. The play ends with a panegyric of Athens and its venerable court of justice, and the Erinyes are propitiated by their name being changed to Eumenides. See Agamemnon; Choephori.

**Eumolpus** (Gr., sweetly singing). In Greek mythology, son of Poseidon, the sea-god, by a mortal mother, Chiōnē, who, in remorse, threw the infant Eumolpus into the sea. He was saved by Poseidon, and after many adventures reached Attica, where he perished in a war with Erechtheus, the Athenian king. He was credited with being the founder of the Eleusinian mysteries, and his descendants, the Eumolpidae, were priests at Eleusis throughout all Greek history.

**Eunuch** (Gr. *eunē*, bed; *ekhein*, to keep). Word originally applied to a man in charge of the women's apartments in Oriental countries, but afterwards to a castrated attendant in the harem. The custom of entrusting women to eunuchs has prevailed in the East since Babylonian times, and was imitated by the later Roman emperors. These eunuchs frequently acquired great power and high position. In modern times lads were castrated in order to preserve their clear boyish voices. Italian churches employed *castrati* in choirs, but Leo XIII abolished the practice in 1878. From time to

time religious fanatics have undergone self-mutilation, the Skoptsi, of Russia, being notable examples. The only Christian self-castrate of note was Origen.

**Euonymin.** Extract of the bark of *Euonymus atropurpureus*, the spindle-tree of the U.S.A. It is useful for constipation associated with disturbance of the liver. See Spindle Tree.

**Eupatoria.** Seaport of S. Russia. It stands on the W. coast of the Crimea at the N. end of Kalamita Bay, 40m. N.W. of Simferopol. The chief industries are soap-boiling and tanning, and considerable trade is done in grain, wool, hides, and salt. Its Tartar name was Gyuzleve, Russian Kozlov. In 1783 it was taken from the Tartars by the Russians, who re-named it Eupatoria, after the ancient town founded by Mithradates VI the Great, King of Pontus. In 1855-56 Eupatoria was occupied by Anglo-French troops. Pop. 30,432, mainly Tartars and Karaite Jews.

**Eupatridae** (Gr. *eu*, well; *patrē*, father). Nobility of Athens and Attica, supposed to be descended from the ancient heroes. The rest of the inhabitants were roughly divided into Geomori or farmers, and Demiurgi or artisans and traders. As the kingship declined, the influence of the Eupatridae increased until they virtually governed the state. Their influence was checked by Draco's Code of Laws, providing for the administration of justice equally among all classes, and ended by the constitution of Solon. See Draco; Solon.

**Eupen.** District and town of Belgium. The territory known as the Kreis (circle) of Eupen lies S. of Aix-la-Chapelle, and covers an area of 40 sq. m., with a pop. of about 40,000. It is fertile, with rich pastures and meadows, and its chief industry is dairy farming. It contains Eupen, Raeren, Kammerdorf, and Conzen. The town, the administrative centre of the Kreis, has a pop. of about 14,000. It is situated on the Weser, 10 m. S. of Aix-la-Chapelle, and is a busy industrial centre, manufacturing woollen and cloth goods, paper, soap, and machinery. It has iron-foundries, breweries, and tanneries.

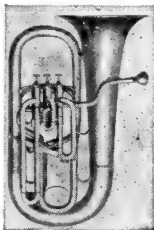
Formerly part of the duchy of Limburg, Eupen was under the government of Austria until 1801, when by the peace of Lunéville it passed to France. In 1814 it was given to Prussia, later forming part of the Rhine province until 1919. The town reverted to the old French name of Neaux (*q.v.*).

By the treaty of Versailles, Germany renounced in favour of Belgium all rights and title over the

territory comprising the whole of the circles of Eupen and Malmédy. The inhabitants were "entitled to record in writing a desire to see a whole or part of it remain under German sovereignty." This was not the same procedure as adopted in the plebiscite areas like N. Slesvig. Belgian troops occupied Eupen on May 26, 1919, taking it over from the French. See Belgium.

**Euphemism** (Gr. *eu*, well; *phēmē*, voice). Substitution of refined and delicate words for coarse and vulgar words conveying the same idea. The object is to suppress as far as possible painful or unpleasant subjects which yet must be referred to. While literature, like art, properly embraces the entire range of human activity, its function is to idealise and refine, and it therefore employs euphemism in dealing with such matters as strong animal passions, gross pleasure, excessively painful or repellent conditions. The shock of an ugly or revolting image is more violent when presented in words used only by the coarse-minded, but it is mitigated if presented in a less familiar euphemism. Thus by euphemism refined pleasure may be extracted from subjects which at first seem repugnant.

**Euphonium.** (Gr. *eu*, well; *phōnē*, sound). Brass wind instrument of the saxhorn family. Of bass pitch and tone, it is of the same pitch as the baritone saxhorn, but its bore is wider and tone fuller. The euphonium is the chief bass solo instrument in military bands, and often doubles the melody an octave below the cornets. It also plays bass parts with the heavier bass instruments, bombardon, bass tuba, etc. Euphoniums are made in C and B flat, both played as non-transposers. In brass bands the B flat euphonium is sometimes written for on the treble staff, when it becomes a transposer, and the notes are placed a major ninth higher, i.e.:



**Euphonium.**  
4-valve instrument

By courtesy of  
Hawkes & Co.

The open notes of the B flat instrument are:



The open notes of the B flat instrument are:



and its three, four, or five pistons complete the scale, and give a chromatic compass of over three octaves.

**Euphorbiaceae** (Spurge Family). Large natural order, comprising trees, shrubs, and herbs. They are mostly with milky juice, found in all parts of the world except the Arctic zones. The leaves are all undivided, and either alternate or opposite. The sexes are always in



**Euphorbiaceae.** Foliage and flowers of the box, *Buxus sempervirens*

separate flowers without petals. About 3,500 species are known, including spurge, mercury, box, castor-oil plant, etc. Preparations of *Euphorbia pepus* and *Euphorbia pilulifera* are sometimes used in medicine, to relieve conditions associated with difficult breathing. The order is named after a Greek physician, Euphorbus (1st century B.C.).

**Euphorbus.** In Greek mythology, a Trojan hero slain by Menelaus. Pythagoras, who taught the transmigration of souls, believed that he himself had once been Euphorbus, and in proof he unhesitatingly identified the shield of Euphorbus in the temple of Hera near Mycenae as his own.

**Euphotide** (Gr. *eu*, well; stem, *phōt*, light). Coarsely crystalline basic rock, belonging to the family of gabbros. It consists essentially of the mineral diallage and plagioclase felspar, with minor quantities of iron and carbonates as accessories. It occurs in the Alps, Corsica, and elsewhere.

**Euphrates.** The western river of Mesopotamia, flowing over the alluvial plain to join the Tigris and enter the Persian Gulf. One of the notable rivers of antiquity, the joint valley was the home of the earliest civilization. The river, called Frat by the Turks, rises in the Armenian highlands, about lat. 40° N. The parent streams, the Kara Su and the Murad Su, originate well over 1 m. above sea level, in a land snow-covered and ice-bound for three months. Both flow at first W. between snow-clad



Euphrates. Tomb of Ezra near Kurna, at the junction of the Euphrates and the Shatt-el-Arab

ridges; the Kara Su crosses the plain of Erzerum, and is a big river, 200 ft. in width; it breaks through the southern ridge by a series of rapids, receives the Murad Su at Keban Maden, flows still to the W. and then breaks through a second ridge by a long, narrow gorge, to enter the Malatia plain at a level of about 2,600 ft. The Murad Su, which rises near Mt. Ararat, has a wilder course than the Kara Su, and receives greater quantities of melted snow.

From the plain the Euphrates has a rocky course through the Tauric mts. to Samsat, falling 1,500 ft. in about 100 m., to emerge on to the lowland and fall 1,000 ft. in 1,800 m., a broad, majestic stream only crossed until quite recently by primitive ferries. In the neighbourhood of Aleppo, the river is but 80 m. from the N.E. corner of the Mediterranean Sea, but it almost immediately turns definitely to the S.E. on its way to the Persian Gulf. The lowland course is in a sandy trough, comparable to that of the Nile in Egypt; a narrow bordering strip is cultivable by the use of river water; it receives only one important tributary, the Khabur, and consequently decreases in volume by excessive evaporation.

During hot summers it becomes fordable; nearer Kurna, where it joins the Tigris, it percolates into marshes, losing still more water. The combined stream is the Shatt-el-Arab. The Euphrates has no large modern town on its banks, yet the site of Babylon is due S. of Bagdad. The stream is navigable for small craft to Birejik on the caravan route to Syria. During the Great War important battles were fought at Ramadie and Khan Baghdadi. See illus. facing p. 811 and p. 813.

**Euphuism** (Gr. *euphuês*, clever). Name given to the artificial style in which John Lyly (*q.v.*) couched his famous romance, *Euphuës*, the Anatomy of Wit, 1579, followed in 1580 by *Euphuës* and His England. The characteristics of this "new English" were the balanced antithetical sentences marked by elaborate alliteration, the excess of classical

allusion, and the extravagant drafts upon natural history for purposes of moral reflection. The high artificiality of euphuism carried the seeds of decay within it, and it died before the 16th century was out. Scott claimed to have modelled Sir Piercie Shafton in The Monastery on the euphuistic fashion which prevailed for some years.

**Eupolis** (d. c. 410 B.C.). Athenian comic writer. He was a contemporary of Aristophanes and Cratinus, with whom he was associated by Horace and others as one of the chief representatives of the Old comedy. Among his comedies, of 12 of which fragments remain, were *Kolakes* (the Flatterers), ridiculing the wealthy Callias, a patron of learning, who was always surrounded by a host of toadies; *Marikas*, an attack on the demagogue Hyperbolus (*q.v.*), represented as a slave; *Dêmoi*, lamenting the unhappy condition of the state under the encroachments of democracy; and *Baptæ* (the Dippers), an exposure of the licentious practices of Alcibiades and his companions in connexion with a Thracian ritual.

**Eurasian**. Term originally denoting the offspring, and their descendants, of a European father and a Hindu mother. It was formed out of the continental names, about 1820; the colloquial name in previous use was *chee-chee*. In India 100,451 were returned at the last census under the official designation Anglo-Indians. The term now denotes any mingling of European and Asiatic blood, and, in physiology and ethnology, natural or ethnic characters common to both continents.

**Eure**. River of France. It rises in the dept. of Orne and flows through the dept. of Eure et Loir to the Seine, which it enters near Pont de l'Arche, not far from Rouen. Its length is about 70 m. and Chartres is the chief place on its banks.

**Eure**. Department of France. In the N.W. of the country, it is a fairly level area, and the soil is fertile. Much of it is covered with forest, but elsewhere wheat is grown. Horses, sheep, and cattle are reared, a great deal of fruit is cultivated, and the peasants export butter and eggs. The Seine borders the dept., which is also drained by the Eure, Rille, and

other tributaries of that river. Evreux, the capital, Elbeuf, Les Andelys, and Louviers are the chief towns of the dept., which has five arrondissements. Before the Revolution, Eure was mainly part of Normandy. Its area is 2,330 sq. m. Pop. 323,651.

**Eure et Loir**. Department of France. An inland dept. in the N.W. of the country, it is flat and fertile in the S. and E., but less so in the N. and W. The former is included in the plain of Beauce, while the latter is known as the Perche and the Thimerais. The chief rivers are the Eure, Loir, and their tributaries. The main products are wheat and oats. Apples are grown, while cattle, sheep, and horses are reared. Chartres is the capital, and the dept. is divided into four arrondissements. Dreux and Châteaudun are other towns. Before the Revolution it was partly in Normandy and partly in Orléanais. Its area is 2,293 sq. m. Pop. 272,225.

**Eureka** (Gr. *heurêka*, I have found). Exclamation of Archimedes (*q.v.*), on finding that he had discovered a method of detecting the alloy in the gold of Hiero's crown. In modern language, the term is applied to an expression of delight on making some great discovery.

**Eureka**. City of California, U.S.A., the co. seat of Humboldt co. It stands on Humboldt Bay, 225 m. N.W. of San Francisco, on the North-Western Pacific Rly. A port of entry, with a fairly good harbour, it is largely engaged in shipping lumber, obtained from the red wood forest region in which it is situated. Its industrial establishments include saw-mills, tanning and shingle works, and tobacco factories. The federal building, city hall, and a public library are among the chief buildings. Settled in 1850, it was incorporated in 1856. Pop. 13,770.

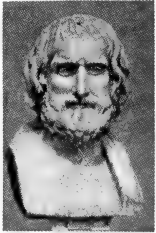
**Eureka Springs**. City and watering-place of Arkansas, U.S.A. It stands near the White river and is chiefly noted for its medicinal springs, opened in 1879 and now public property; to them the town owes its growth and prosperity. Pop. 3,230.

**Eurhythmics** (Gr. *eu*, well; *rhythmos*, measured motion). Art of expressing harmony by gestures, in which physical movement is made to reflect musical notation. It was invented by Émile Jaques-Dalcroze, professor of harmony at the Geneva Conservatoire, towards the end of the 19th century. Time is shown by movements of the arms and notes by movements of the legs. The unit is the crotchet, which is



indicated by a single step, longer or shorter notes being shown by a step with one foot and movements with the other. The various exercises relate to rates and changes of speed, dynamic expression, synco-pation, phrasing, etc., and are made by both arms and legs. There is a School of Dalcroze Eurhythmics in London. See Dalcroze.

**Euripides** (480–406 B.C.). Athenian tragic dramatist. According to tradition, he was born on the



**Euripides,  
Greek dramatist**  
*From a bust*

island of Salamis on the day of the great naval victory over the Persians. A pupil of the famous sophist Prodicus, he seems to have been at first intended for a professional athlete, and secondly, for a painter, but soon took to writing for the stage. In 455 B.C. he exhibited his first tragedy, and in 441 gained the first prize for the first time. He was credited with over 90 plays in all, of which 18 survive. He gained the first prize only five times, his contemporaries apparently regarding him as inferior to both Aeschylus and Sophocles and other dramatists. His vogue increased, however, after his death, and though never the favourite of the critics, he has been the favourite dramatist of many of the world's poets, notably Virgil, Horace, and Milton.

Euripides is undoubtedly a master in the handling of the tender and the pathetic; Aristotle truly called him "the most tragic" of the poets. A reputed misogynist, he has yet portrayed women as fine as any to be found in all literature. As a playwright also Euripides stands high; there is an excitement about his plots and a vividness in his situations, although they sometimes verge on the ridiculous, which are lacking in the plays of Aeschylus and Sophocles. Euripides is, in fact, the most human of the three dramatists, and this quality of humanity

accounts for his greater popularity in subsequent ages. Among the blemishes of his art may be mentioned his artificial prologues and his too frequent use of the *deus ex machina*

Drama; Tragedy. *Pron.* U-ri-pi-deez. **John McBain**

**Bibliography.** The most useful edition of the text, with notes, is that of F. A. Paley, 1857–60. There is an excellent verse translation, with parallel text, by A. S. Way, 4 vols., 1912; and there are spirited renderings of individual plays by Prof. Gilbert Murray; consult also Euripides: an account of his Life and Works, J. P. Mahaffy, 1878; Euripides the Rationalist, A. W. Verrall, 1895; Euripides and His Age, Gilbert Murray, 1913.

**Euripus** (G. r. *euripos*). General name for a narrow channel, specially applied to the strait between the island of Euboea and the mainland. See Chalcis.

**Euroclydon** (Gr. *Euros*, east wind;

*klydon*, wave). Name given in Acts xxvii. 14, A.V., to the gale which, blowing off Crete, seized the ship in which S. Paul was wrecked on the coast of Malta. The form adopted in the R.V. is *Euraquilo*, meaning a tempestuous N.E. or E.N.E. wind of the Mediterranean.

**Europa.** In Greek mythology, daughter of Agenor, king of Phoenicia. While she was playing one day with her maidens, Zeus appeared in the form of a white bull, and Europa was induced to mount on the animal's back. The bull thereupon carried her off over the sea to Crete, where by Zeus she became the mother of Minos, Rhadamanthus, and Sarpedon.

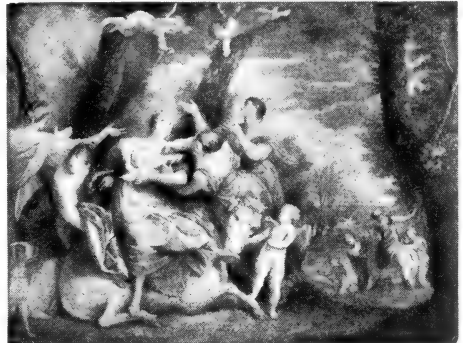
**Europa Point.** Headland at the extremity of the peninsula of Gibraltar, Spain, just S.E. of Europa Bay. To the N.W. is Little Europa Point and to the E. Great Europa Point. Europa Bay is a small circular inlet in the S.W. coast of the peninsula just S. of Shingle Point.

**Eurhythmics.** Two attitudes in a plastic exercise in the rhythmic method of training

(*q.v.*) or divine intervention in unravelling a plot.

The extant plays of Euripides are: *Alcestis*, *Medea*, *Hippolytus*, *Hecuba*, *Andromache*, *Ion*, *The Suppliants*, *Heracleidae*, *The Mad Heracles*, *Iphigenia among the Tauri*, *The Trojan Women*, *Helen*, *The Phoenician Maidens*, *Electra*, *Orestes*, *Iphigenia at Aulis*, *Bacchae*, *Cyclops*, the last being the only extant specimen of a satyric drama. The *Rhesus* is certainly spurious. Of the plays perhaps the best are *Alcestis*, notable for its exquisite delineation of woman's devotion; *Hippolytus*, the tragic story of the illicit love of Phaedra, a plot used by Racine in his *Phèdre*; and *Bacchae*, a brilliant glorification of the worship of Dionysus or Bacchus. The plots of Euripides were all drawn from the old mythology, yet the characters are not cast in heroic mould, but act and talk like Athenian men and women of his time. Euripides

was accused by his contemporaries of endeavouring to undermine faith in the gods and in morality, and for this supposed tendency, as well as for his alleged bad art, he was bitterly attacked by Aristophanes. The last few years of his life were spent at the court of King Archelaus in Macedonia, where he died, 406 B.C. See *Greek Literature*,



**Europa.** The story of Europa depicted by Paolo Veronese  
*Doge's Palace, Venice*

# EUROPE: THE CONTINENT AND ITS HISTORY

A. D. INNES, M.A., Author of *A General Sketch of Political History*, and B. C. WALLIS, B.Sc.

*This article, like those on Africa, Asia, North America, etc., is a general sketch of the physical and racial features, industries and history of the continent. In addition there are articles on each of its countries, whether old or new, on all cities and towns of importance, rivers, lakes, and mountain ranges. See also the biographies of Napoleon; Metternich and other great European figures; also articles on French Revolution: Reformation; Renaissance, and other movements*

Europe is almost the smallest of the six continents, and covers about  $3\frac{1}{2}$  million sq. m. It is thus about the same size as Canada and slightly larger than Australia. Excluding Russia, where two-fifths of the continent is in an indeterminate political condition, France has the greatest area in Europe. Spain, Germany, and Sweden are almost as large; Norway, Rumania, and Italy are about the same size as the British Isles, which has about three-fifths the area of France.

The total population of Europe lies between 350 and 400 millions of people, of whom about a quarter live in Soviet Russia. Germany is the next most populous state; then the United Kingdom, France, and Italy. Several countries have roughly about half the population of one or other of these four—Spain, Poland, Rumania, Czechoslovakia. The remaining states have less than 10 million inhabitants each.

The chief factor regarding population is not so much its absolute number as its relative distribution over the land. The people of Europe live almost wholly S. of the latitude of Petrograd ( $60^{\circ}$  N.). Not numerous between the latitudes of Petrograd and Copenhagen, they are most numerous in a belt of country, about 200 miles or less in width, roughly in the latitudes of London, Cologne, and Cracow ( $50^{\circ}$ – $52^{\circ}$  N.).

## Belts of Population

From Lancashire and the W. Riding of Yorkshire, through the midland counties to the London area, across the sea through Belgium and S. Holland, through the middle of Germany near Cologne, Leipzig, and Dresden, through Bohemia, Moravia, S. Poland (Galicia), and the Ukraine to the valley of the Don, the people are clustered together in a belt of dense population most numerous between Cologne, Lille, and Rotterdam, and gradually thinning out eastwards. From this belt two projections of dense population go southwards—one up the Rhine valley to Zürich and Bern, the other across the Danube at Vienna to Graz and Zagreb (Agram).

Apart from this great populous area, the only other large densely peopled portions are the coastal

strip of Portugal and N.W. Spain and part of Italy. In the latter peninsula, the plain of Lombardy, and a strip of land on each flank of the Apennines reaching some distance S. of Naples, have large numbers to the sq. m. Sicily is almost equally densely populated. These areas with many people do not merge suddenly into sparsely inhabited tracts except where they reach the mountains, the Alps, or the Carpathians. The peninsulas of Jutland, the Balkans, and Spain (except for a fringe along the N.E. coast) have few people; the Rhône valley in France is densely peopled alongside the river.

These facts give an added importance to certain of the small states. Belgium, Holland, Czechoslovakia, and Poland are thus intrinsically greater than Spain, Sweden, or the major portion of Russia, the 'and of the Great Russians, because density of population implies closer community of interests and a fuller national life.

## Anthropological Classification

Anthropologists classify people physically with reference to the shape of the skull. The two extremes are round heads where the width exceeds 85 p.c., and long heads where the width is less than 77 p.c. of the length. Except in Portugal, England, and the areas near the Rhine, the districts of dense population are inhabited by round heads: the Slavs, Italians, and South Germans in these areas are round-headed. In Portugal the people are long-headed. Elsewhere in the densely peopled areas they are mixed, approaching on the average the long-headed type.

**PHYSICAL FEATURES.** From the physical point of view the continent of Europe may be regarded as a peninsula of Asia, extending westwards about one-sixth of the distance round the world from the indefinite E. boundary which is only approximately marked by the Ural Mountains. This peninsular characteristic enters even into the details of the continent, for in addition to the great Scandinavian peninsula in the north and the smaller peninsula of Jutland, there are the three Mediterranean peninsulas, the Iberian, Italian, and Balkan peninsulas. The truly Asiatic character of Europe is revealed by the mountain back-

bone and the great plain which lies between the backbone and the N. seas.

The Alps are merely the central European portion of a great Old World chain of folded mountains which extends from S. Spain by way of the Atlas Mountains in N.W. Africa, the Apennines, Alps, Balkans, and the Caucasus through the Himalayas almost to the shores of the S. China Sea. From the French shores of the Bay of Biscay the Great European plain stretches E. with ever-increasing width until it reaches from the Arctic to the Caspian, and forms a W. continuation of the great plains of N. Asia.

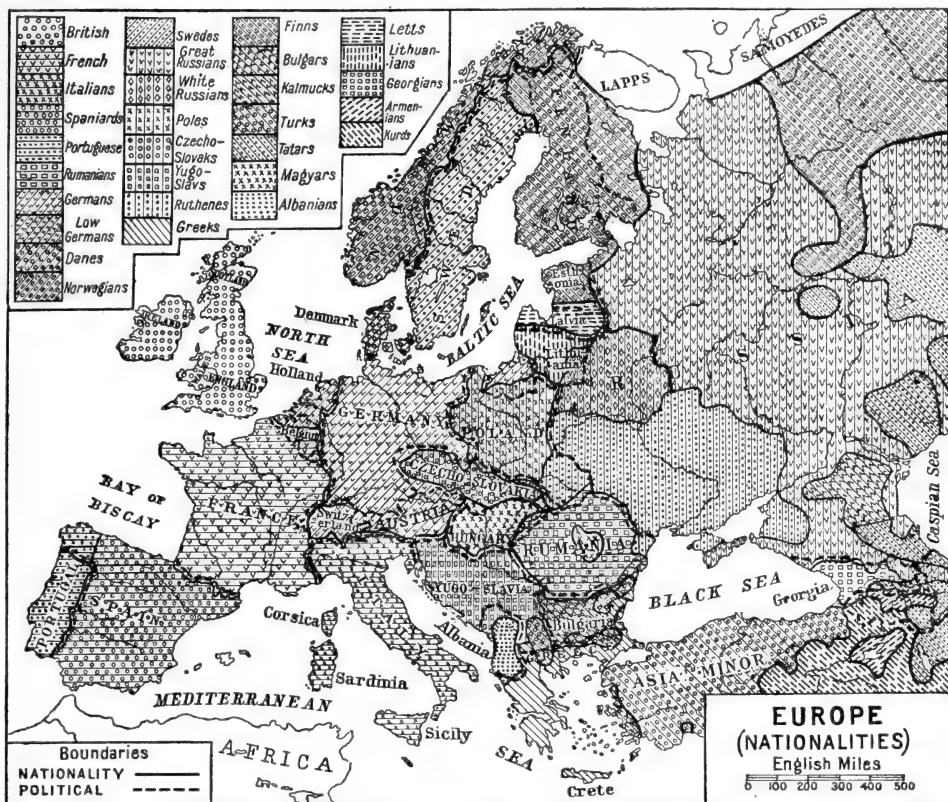
The only section of Europe which is not physically Asiatic is the N.W., where the Scandinavian mountains and the uplands of Scotland and Iceland belong to a continental land mass, older than the rest of Europe, which, it is conjectured, once joined Scandinavia to Greenland, and has become submerged. The E. boundary of Europe is a purely conventional line, the political frontier which separated Russia in Europe from Russia in Asia.

It follows the Ural Mountains across the uninhabitable tundra, but lies well to the E. of the S. two-thirds of this range; in the S. it follows the Ural river almost to Orenburg, and then it lies W. of that river until it reaches the Caspian. Even were the boundary purely physical, i.e. the Ural mountains and river, it would not serve any better than the present administrative limit to separate the natural vegetation, the types of cultivation, or the peoples of W. Asia from E. Europe. The steppes, the forests, the nomad Kirghiz are continuous across the frontier.

## The Great Rivers

Beginning with the Garonne, many rivers flow across the Great European Plain. The chief of these are the Loire, Seine, Oder, Vistula, and the streams that cross N. Russia to the Arctic. The Iberian streams, Douro, Tagus, Guadiana, Guadalquivir, and Ebro have carved valleys in the plateau. The Po, the Vardar, Struma, and Maritza flow to the Adriatic or the Aegean, their course guided by the great chain of mountains. The Dniester, Dnieper, Don, and Volga





Europe. Map showing the main distribution of the nationalities of Europe. Scattered peoples such as the Jews and Gypsies are omitted. The Celts of Scotland, Ireland, and Wales are included under British, and those of Brittany under French.

are lowland rivers which have found their way to the Black Sea or the Caspian across the plain.

But the most important rivers of Europe are the three great Alpine streams, the Rhône, Rhine, and Danube. Their sources lie near together, but their mouths are as far apart as they could well be. The Rhône leaves the Alps at Lake Geneva and flows to the Mediterranean in the trough between the central massif of France and the W. Alps, the trough occupied in the N. by the Saône, the principal tributary of the Rhône.

The Rhine suddenly turns N. at Basel, and by a geological accident flows through the gorge between Bingen and Coblenz, ultimately to the North Sea. The Danube flows along the N. edge and round the E. end of the Alps, fed first by streams from the transverse valleys of the Central Alps and later by streams, such as the Drave, from the longitudinal valleys of the E. Alps. Its lower course is along the N. edge of the mountainous Balkan peninsula; here it receives only one great tributary, the Theiss, not of

Alpine origin. Next in importance is the Elbe, which issues from the Bohemian plateau to cross the German plain to the North Sea.

The most useful rivers are those which cross the plain to the Channel, the North and Baltic Seas; there is considerable river traffic on the Rhine and the Elbe, and a fair volume of traffic on the Seine, the Schelde, Oder, and Vistula. E. of the Rhine there is some trouble with winter ice and spring floods.

#### Rivers and Canals

But the greatest value of these streams lies in their use in connexion with canal systems, which are being developed in order to join them all together; these canals have been made more or less parallel to the coast and some, distance inland, so that eventually it will be possible to send goods by barge from Paris to Bromberg through a series of canal ports, Hanover, Berlin, etc., which lie parallel to the seaports Havre, Antwerp, Rotterdam, Bremen, Hamburg, Stettin, and Danzig, with which they will have barge and steamer connexions.

The lakes of Europe are not so large or important as those of Africa or N. America. The largest, Wener, Ladoga, Onega, and the Finnish lakes are shallow expanses on the plains, due to dams across the lower ends of hollows scraped in the rock surface during the Great Ice Age. The most beautiful, those of the Alps, Como, Maggiore, Lucerne, etc., are long, narrow, deep lakes due to dams across the ends of glacier-moulded valleys.

The Arctic coast of Europe is flat. The Norwegian coast, like the W. coast of Scotland, has a well-developed system of fiords, submerged glacier-moulded valleys. For 100 m. along the coast of the great European plain there is a belt of sand dunes, best known in Holland, Belgium, and S.W. France (the Landes). The rocky coast of the French peninsula, the Cotentin and Brittany, is a break in this belt. The N. coast of Spain drops sheer from the mountains to the great depths of the Bay of Biscay. The W. Iberian coast, like that of S.W. Ireland, consists of drowned river valleys, known technically as

rias. The Mediterranean coasts are rocky, and in the W. are the edge of a fractured area, the W. Mediterranean covering a foundered land mass. The E. Adriatic coast is the edge of a mountain ridge like that of the Aegean; the gulfs of Cattaro, Corinth, and Salonica are flanked by ridges and headlands.

#### Europe's Physical Boundary

The Baltic and North Seas, including the English Channel, are shallow, and are really water-covered portions of the great European plain. This implies that the physical boundary of Europe lies well W. of Ireland. It is customary to indicate the edge of the land, the limit of the deep ocean, by the 100 fathom (600 ft.) line. This line runs to the coast in the Bay of Biscay, sweeps round the British Isles, runs in a well-marked deep S. of Norway, and continues N. near the Norwegian coast. The British archipelago consists, therefore, of continental islands with shores which shelve gradually below the sea.

**GEOLOGY.** The dominant physical features of Europe mark its geological development. N.W. Ireland, N. Scotland, Scandinavia, and Finland are the oldest parts of Europe; they consist of Archaean igneous rocks, which are the residue of an ancient continent once extending away to the N. and W. Within and adjacent to these areas arose a series of folded mountains, consisting of Silurian rocks with intrusions of granite, still to be seen in the heights of Wales, N.W. Ireland, Scotland, Scandinavia, and Esthonia. Among these peaks the old Red Sandstone of the Devonian horizon was laid down in the valleys. Carboniferous rocks, magnesian limestone, etc., were then deposited under a Carboniferous sea, or in the marshes along its edge.

At the next stage a new set of mountain folds arose; their relics are the hills of S.W. Ireland, S. Wales, Cornwall, and Brittany, the Ardennes, the Black Forest, the Vosges, the plateau of Bohemia, the Auvergne plateau, and the Meseta or major portion of the Iberian plateau. These folds belong to the Armorican period. The next great incident was the invasion of the Cretaceous Ocean, which washed the shores of the ancient continent and of the islands which were the exposed tops of Armorican Mts. No land had yet appeared to the S.

In tertiary times, first the Pyrenees and later the Sierra Nevada, N. African Atlas, the Apennines, Alps, Carpathians, Balkans, Crimean and Caucasus

Mts. emerge as crumplings of the earth's crust. Their sinuous curves are due to the resistance of the stable relics of the Armorican Mts. During this epoch most of the old continent sank beneath the ocean, and as the new mountains rose they were denuded, and the products of erosion filled the seas between them and the more ancient land. The new mountains vary in the amount of material removed as they gradually uprose; in the Apennines and Carpathians the older underlying igneous rocks are not laid bare as they are in the Balkans and the Alps.

While these great changes were taking place the arrangement of land and water upon the earth was greatly modified beyond European limits. The N. Atlantic Ocean was formed, the ancient ocean between the beginnings of Europe and an older continent to the S., now represented by Africa and India, dwindled to form the Mediterranean; the relative level of sea to land was gradually altered, and the shallow seas then existing have been gradually filled in with alluvial deposits since tertiary times. These shallow seas were at least once disturbed by a great ice sheet which extended from the N. as far S. as the Thames, Bohemia, and the Carpathians.

#### Erosion and Glaciation

In its subsequent retreat the ice left behind it quantities of glacial debris, so that the whole of the great European plain from Ostend to Archangel is the product of erosion from the southern mountains and glaciation from the remains of the ancient northern continent. The plains of the Po, Hungary, the lower Danube, and N.W. of the Caspian are, however, solely erosion deposits.

**CLIMATE.** Owing to its peninsular character the climate of Europe is modified by the oceanic conditions which affect it on the W. The prevalent surface air currents are the W. winds, which regularly traverse definite cyclone tracks from the Atlantic Ocean, and carry moisture far into Europe. The prevalent surface oceanic movements are the drifts of wind-driven warm water, which prevent the coasts of W. Europe S. of the North Cape from being ice-bound in winter.

In relation to its latitude, winter conditions are abnormal. In Jan. the temperatures of Scotland are 35° F. above the average for the latitude, so that Cape Wrath, which has a temperature of 40° F., lies in a latitude where the average temperature is 5° F., i.e. 27 degrees of frost. Only in the extreme

E. of Europe, on the Kirghiz steppe, is the January temperature colder than the normal for the latitude. From Brittany through Stettin to Petrograd the coast strip is 15° F. above the normal. The boundary line, 32° F. isotherm, which limits the area frost bound in winter, starts at the North Cape, goes S. to Hamburg and the Alps, and crosses the Balkans and the Crimea to Baku. E. and N. of this line the winter frosts last from 1 to 7 months, the period lengthening towards the N.E. of Europe. These facts show the influence of oceanic conditions.

In summer, temperatures are normal; the Arctic circle has a temperature of 50° F., lat. 55° N., 70° F., while the coast lands of the Mediterranean have three hot months, when the temperature exceeds 68° F.

The rainfall exceeds 60 ins. annually on the highest areas and on parts of the W. coast. The Pyrenees, Alps, Balkans, and Caucasus include districts where the rains exceed 40 ins., but most of Europe has an annual precipitation of between 20 and 40 ins. Spain, E. and N. Russia receive less than 20 ins. In the Mediterranean area most rain falls during the cool season; the summers are hot and dry. On the Atlantic coast rains are usually heaviest during late autumn. In the E. most rain falls during hot weather.

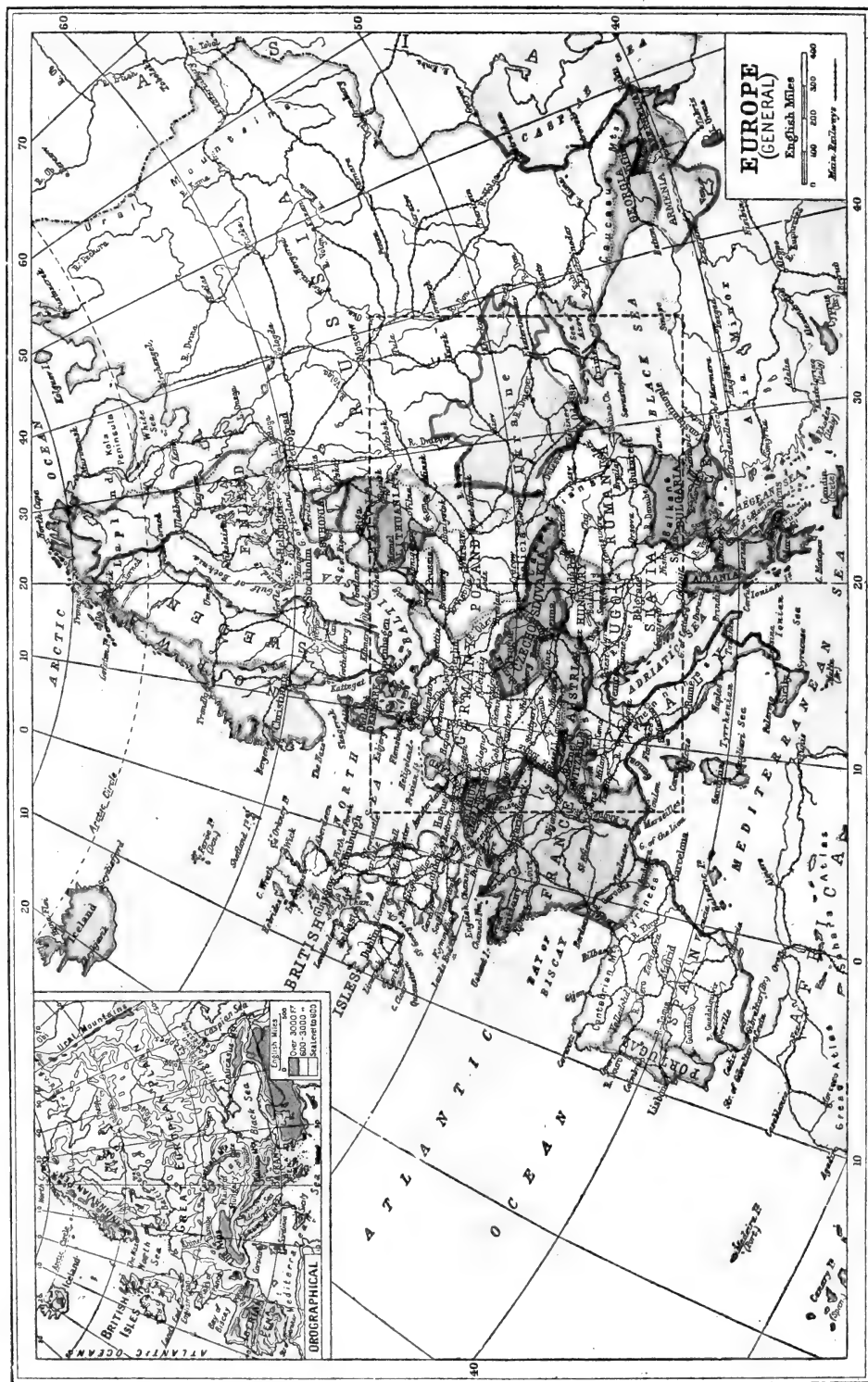
The Mediterranean peninsulas are lands of clear skies with a maximum duration of sunshine in excess of 2,500 hours annually. Scandinavia is a cloudy area with less than half as much sunshine. In December Scandinavia does not average 1 hour of sunshine a day, while Spain averages at least 3 hours daily.

**VEGETATION.** From N. to S. the natural growth occurs in belts merging each into the next. Along the Arctic shore the tundra has stunted willows and a few annual plants; to the S. lies the forest, at first coniferous, then deciduous; farther S. the trees give place to the steppe or natural grass land; in the extreme S. there is little grass, only evergreen shrubs, cypresses, and chestnut trees.

#### Growth of Economic Plants

The vegetation zones are best marked in the E. In the W., Germany and England, for example, have had their natural forest cover removed by man; there are no wide plains in France to be grass land like the Hungarian Alföld (*q.v.*). The mountains are forested on the lower slopes, and, if high enough, snow-capped; the plateaus tend to be forested, or bare if there is insufficient soil.





For fuller details of the area within the dotted lines see Coloured Map of Central Europe. Larger scale maps of the different countries accompany the articles on those countries  
Specially drawn for *Harmsworth's Universal Encyclopedia*

The N. limit of the growth of economic plants illustrates the effects of climate. Greece, peninsular Italy and S. Spain are suitable for olive trees. The N. limit of the vine is approximately 50° N., of wheat 60° N. Wheat grows best between 40° and 50° N., maize about 45° N., rye about 55° N. The most characteristic region of Europe is the Mediterranean area, the land of wheat, wine, and olive oil as the staple foodstuffs, of winter rains and summer droughts, of luscious fruits—oranges, lemons, etc. The W. margin is the land of wheat, meat, and milk, of autumn downpours and muggy warm winters; the N.E. lands are notable for rye and alcohol, hard frosty winters and hot, dusty summers.

**NATIONALITIES.** Politically, Europe is the most important portion of the Old World. Along its S. and W. margins has developed a civilization which has been carried to the New World and to Australasia, while in modern times the civilization of W. Europe tends to dominate the world and to guide or control the younger states now achieving nationhood.

#### Branches of the Slavs

The boundaries of the new European states coincide fairly completely with the limits of the habitation of definite types of people. Finland, Esthonia, Latvia, and Lithuania are the homes of people, Finns, Esthonians (akin to the Finns), Letts, and Lithuanians, who are not Slavs and are mostly Protestants. By speech, history, and religion, they were antagonistic to the Russian Slavic autocracy. Poland is the land of the Poles, a Roman Catholic Slav people with a distinct Slav speech, who maintained for many centuries a kingdom ultimately divided between Russia, Prussia, and Austria.

Czecho-Slovakia includes within its boundaries Czechs, Moravians, and Slovaks, a Slav people akin to the Poles, Roman Catholics as a rule, but with a distinct Slav tongue and a separate history, mainly centred round the former kingdom of Bohemia. These two branches of the N. Slavs have adopted republicanism. The S. Slavs of Yugo (S.) Slavia include the Slovenes, Croats, and Serbs.

The Slovenes and Croats are Roman Catholics with no definite separate history; the Serbs belong to the Greek Orthodox Communion, and their kingdom of Serbia was in existence before the Turks invaded Central Europe. The common speech of the three branches has been obscured by the use of different scripts, the Serbs use Cyrillic and the others Latin characters for

the written language, but the unity of tongue and of nationality have given rise to the extension of the kingdom of Serbia into the Serb-Croat-Slovene (S-C-S) kingdom.

The Bulgars are akin to the S. Slavs and their state was carved in 1878 out of the Turkish dominions. The Rumanians are not Slavs, although almost completely surrounded by Slav peoples.

Hungary is the land of the Magyars, an Asiatic people from the Siberian steppes. Their speech has no affinities among the main European languages; its strangeness has tended to isolate the Magyar from the peoples of W. Europe. This isolation has been intensified by the strong national feeling which maintains a nice distinction between Magyars and foreigners, and possibly accounts for the unique government compromise which has been established. The new Austria is almost precisely the habitation of the Austrian Germans, all the non-Germanic areas of the old Austria have been detached and the Germanic section of the old Hungary has been added to the Germanic nucleus of the once powerful Austrian Empire; the new Austrian republic is prohibited from joining the republican states of Germany. Greece, like Rumania, has extended its boundaries to include areas largely inhabited by co-nationals.

#### Denmark and North Slesvig

The Danes of N. Slesvig are now included in Denmark. Of the other states France has regained the lost provinces, Alsace and Lorraine, Italy has gained the Trentino and Istria, and Belgium has gained Malmédy, etc., all acquisitions based upon nationality. The peoples of the remaining countries, Portugal, Spain, etc., are homogeneous except in Belgium and Switzerland. In both these small countries two peoples, one Teutonic and the other French in speech and origin, constitute the nation. The Jews are scattered in many lands in small numbers, chiefly in the large cities, but forming considerable proportions of the population in Poland, the Ukraine, Rumania, and in Hungary.

**AGRICULTURE AND FISHERIES.** The largest portion of the people of Europe work on the land, or are dependants of farmers and peasants. Wherever it is at all possible the land is cultivated, even if only to grow some crops for home use. These domestic harvests must be ignored in this summary, and attention paid to the cultivation of the ground as a business. Of the great cereal crops Europe produces half the world's wheat, two-thirds of the

oats, three-quarters of the barley, nearly all the rye, but only a seventh of the maize.

Of animals, Europe has nearly half the world's horses, a third of the sheep, more than half the pigs, and nearly a third of the cattle.

#### European Wheat Belt

Within Europe the wheat belt is approximately the N. edge of the area of the densest population, and in the E. the areas E. and S. of this belt. The rye belt lies farther N., where it is colder, the maize belt farther S. Oats are grown largely between rye and wheat; barley is grown with the wheat and to the S. of it. W. Europe—i.e. the U.K., France, Belgium, Holland, and Germany—may be compared with the rest of the continent. This area produces almost a third of the wheat of Europe, half the oats, a third of the barley and rye, and contains a third of the sheep, nearly half the horses, three-fifths of the pigs, and a third of the cattle. In the colder areas of poor soil in W. Europe, potatoes are produced in large quantities, and roots—swedes, mangolds, etc.—are an important crop in the W. where required as winter food for stock.

Europe produces roughly half the world's sugar from the sugar beet, extensively grown in Germany, N.E. France, Czecho-Slovakia, Poland, Austria and Hungary. Nearly all the rest of the world's sugar is obtained from tropical sugar canes.

Flax and hemp are grown on the cold wet soils of Russia, Germany, and Ireland. In the Mediterranean area the products are chiefly fruits—oranges, lemons, currants, figs, plums, prunes and olives. The cultivation of the vine extends from the Mediterranean to lat. 50° N. Europe leads the rest of the world in the production of these fruits, which require dry, hot summers and cool, moist winters.

Europe produces no coffee or cocoa, only about one-eighth of the world's tobacco, and a small harvest of rice, chiefly in Italy. In addition to the flax mentioned, Europe produces a fifth of the world's wool from a third of the world's sheep, no cotton or jute, but obtains some raw silk in France and Italy.

Much of the fishing along the coasts is for local consumption. The main fisheries of world-wide importance are located in the North Sea, and off the Norwegian coast, where herring and cod constitute the main catch. The fishing grounds are in shallow waters, where the sea temperatures are never low enough for freezing nor



too hot for the fish. In these waters large quantities of fish food accumulate, probably borne S. from the Arctic Ocean. Although much of the catch is sold fresh, being distributed by rail from the fishing ports, a great deal of it is salted or cured and sent overseas or to Mediterranean countries.

**MINING.** About half the world's coal and three-fifths of the world's iron ore are mined in Europe. The chief collieries of Europe lie within the belt of dense population, but the iron mines are more widely scattered, Spain and Sweden gaining large quantities of iron ore, but little or no coal. Half of the world's bauxite, the source of aluminium, is mined in France. Greece, Yugo-Slavia, and Russia are sources of chrome ore. Over a tenth of the world's copper is obtained in Germany and Spain.

Gold is mined in the Ural Mts., and in the Perm district in Russia, Europe producing an eighth of the world's total. Graphite, used for pencils and as a lubricant, is obtained in Bavaria and Austria. France obtains a third of the world's gypsum, the source of plaster of Paris. Two-fifths of the world's lead is mined in Europe.

#### Oil Fields and Mineral Products

Europe produces about a quarter of the world's petroleum, of which about two-thirds is obtained in the Baku district. The other main oil fields are in Rumania and E. Galicia.

About 90 p.c. of the world's supply of platinum was, before 1914, obtained from the Ural Mts. The Strassfurt deposits, Germany, are the world's chief source of potash salts, valuable fertilisers. Half the world's mercury is European in origin; the chief sources being Almaden (Spain) and Idria (Carniola); new sources are being tapped in Italy (Mts. Amiata and San Salvatore). Sicily is responsible for half the world's supply of sulphur. Portugal mines half the tungsten ore of Europe, the industry being state controlled. Zinc is mined in Germany, Belgium, Czechoslovakia, Poland, Sardinia, and Spain.

**MANUFACTURES AND TRADE.** Parts of Europe are almost as primitive in their industrial outlook as England was before the industrial revolution; almost everything in use is of local or domestic manufacture. Nearer the big centres of population this primitive simplicity is gradually left, and the opposite extreme is met in the big cities, where everything is bought, and nothing made at home. In every country domestic industries abound, and in some, domestic products enter slightly into general trade. The present outline of

European industrial activities must be limited to the great industries, and must assume reconstruction of industry on the same lines and scale as it existed in 1914.

The belt of dense population is due partly to the fertility of the soil, but especially to the presence of coal and iron, and the consequent development of ironworks and textile factories. On the mainland the industrial area begins in N.E. France with the textiles of Rouen, Lille, Roubaix, passes through Belgium with the factory towns centring on Liège, and on to the Rhine district near the ironworks at Essen, the textiles of Crefeld, Barmen, and Elberfeld.

#### Hardware and Textile Industries

The central group of factories include those of Saxony (Chemnitz), Silesia (Breslau), Czechoslovakia, near the mountainous rim in many small towns, and Poland, near Lodz. Farther E. in the Moscow district, near the Oka coalfield, hardware and textiles are made. The southward extension of the crowded Rhine population is intimately related to the collieries, iron mines, steel works, and textile factories of Alsace and Lorraine. This extension continues even into N. Switzerland, for the absence of coal is balanced by abundance of water power, and Zürich is noted for textiles. The southward extension past Vienna is dependent in part upon the development of textile industry in Moravia, and in part upon the iron and steel works of Austria.

The isolated areas of dense population resemble the main belt. In Lombardy the soil is fertile, water power is used as well as imported coal and timber, and there is a textile industry round Milan. In N.E. Spain the textiles of the Barcelona district depend upon sea-borne coal. In the Rhône valley the factories of the Lyons neighbourhood obtain coal from a small local coalfield. It thus appears that W. Europe in particular is a great manufacturing district, and that the main factor in the localisation of the industrial towns was the circumstance that, in the dim geological past, carboniferous deposits were laid down in the swamps that fringed the island relics of the Armorican mountains.

On the continent there is no such distinct separation of cotton, woollen, and linen districts as exists in Britain; all the cotton factories work under the climatic disadvantage of a drier atmosphere than prevails in S.E. Lancashire, and are unable to specialise in fine counts of cotton. Only the silk mills of S. France, Italy, and Swit-

zerland are separate; this is due in part to the localisation of sericulture to the Mediterranean lands.

The elementary fact behind the trade of Europe is that she requires foodstuffs for the people and raw materials for the factories. Food and cotton must be paid for with factory products. But the factories cannot all produce the same type of goods equally cheaply; consequently some specialise, others produce only half manufactured articles, others become noted for articles of luxury. At the same time Europe is so large that the products of the E. and W., of N. and S., differ considerably; so Russian wheat is sent to England, Lyons silk is sold in Petrograd, and Manchester goods are bargained over at Nijni Novgorod. Russia, Hungary, and Rumania send wheat, oats, barley, and rye to Britain, Germany, Belgium, Denmark, and Holland; France, when her harvest is poor, imports wheat. British coal goes to Italy, Spain, and the Baltic ports. German chemicals, Austrian glass, Danish butter, Dutch cheese, and Greek currants are sent away in considerable quantities. The products of the fisheries of the North Sea find their readiest market in Spain and Italy.

#### Imports from Overseas

Raw silk, tea, and rice reach Europe from India, China, Japan, etc. Coffee from Brazil and cocoa from the Gulf of Guinea, meat, wool, and wheat from Argentina, reach W. Europe from the S. Atlantic. The U.S.A. sends wheat, meat, tinned goods, iron and steel goods machinery, and motor-cars across the N. Atlantic. Australasia supplies wool and mutton, butter and fruits, chiefly through the Suez Canal. W. Europe sends away cottons, woollens, silks, hardware, and leather goods in exchange, usually to the respective colonies established by the European states.

**COMMUNICATIONS.** The ordinary railway map fails to represent the railway system correctly, not differentiating between single and double track lines, frequently not indicating narrow gauge lines, rarely showing the lines used for slow or express traffic, or the frequency of the service. In general there are no double tracks E. and S. of a line from Trieste to Moscow, or in S. Italy or Spain. Narrow gauge lines are used for mountainous areas or in Balkan lands for branches which end "in the air." Express traffic lines are rare except for the connexions between the great cities, and the frequency of the trains decreases away from the Great European Plain to the E., S.E., or S.

Paris, Berlin, and Vienna are the great rly. junctions. Cologne, Dijon, Munich, Milan, Warsaw, Budapest, and Moscow are junctions of less importance. The Alps and Carpathians interfere with rly. traffic, as a glance on the rly. map shows, though each range is traversed by passes or bored by tunnels. The Pyrenees are circumvented by the E. and W. routes and the straits of the Danish archipelago are crossed by train ferries. The great rivers control rly. development as definitely as the mountains, for either the streams themselves or their flood plains are too wide to be crossed by many bridges, so that the Rhine, Danube, and Rhône have rlys. on either bank and connexion from one line to the other must be most often made by ferry.

The rivers of the plains are used for barge and steamer traffic. Most have been canalised, *e.g.* the Rhine, Seine, Elbe, Oder, Danube. Where the river is unregulated traffic is interfered with by the spring floods. The E. rivers, Volga, Dnieper, Don, are frozen for months; the Central European streams are made dangerous by drifting ice, ice harbours being necessary on the Rhine. From Paris to the Vistula the Great European Plain has many canals connecting the fluvial waterways; Antwerp is an outpost for Germany, as much merchandise unloaded at the seaport is distributed by the canals radiating thence.

These waterways link up the canalised rivers, and facilitate the distribution of goods from the seaports at the river mouths. It was a German dream to improve the canals so that large vessels could traverse Europe from the North Sea to the Black Sea, either by the Rhine-Danube or the Elbe-Danube routes; this ideal was connected with the use of the Kiel ship canal to help Hamburg to dominate the Baltic Sea commercially.

**SEAPORTS.** Owing to the increasing size of modern ships, the tendency is to concentrate the ocean traffic of each country upon one or two great ports. In Britain, London and Liverpool far outstrip any other seaport; Marseilles and Havre, Antwerp, Rotterdam, and Hamburg are pre-eminent in their respective countries. The chief Baltic ports are Petrograd, Stockholm, Riga, Königsberg, Danzig, Stettin, Kiel, and Copenhagen. The chief Black Sea ports are Odessa, Varna, Constanta, and Galatz, on the Danube; Constantinople, the Piræus, (Athens), and Salonica are the great ports of the S.E. In the Adriatic Sea, Venice, Trieste, and Fiume are the main ports, while Brindisi is a

packet station. In the W. Mediterranean Naples, Genoa, and Barcelona are the chief ports. Cadiz, Lisbon, and Bordeaux lie on the Atlantic; Dunkirk, Amsterdam, and Bremen on the North Sea.

**B. C. Wallis**  
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**HISTORY.** The continent of Europe with its present contours emerged after the last ice age, probably not less than 20,000 years ago. For untold ages before, the greater part of it had been subjected to Arctic or tropical conditions of varying intensity, so that geologists divide the whole period into a succession of ice ages with non-Arctic intervals between them. Man had existed before the last ice age, but the new Europe was repopulated, not by the descendants of the "drift" men, but by men who, moving from warmer regions, made their way across it as the ice receded. In the course of some thousands of years tribes coming either from the East or out of Africa had spread thinly over the habitable area, settling in communities, acquiring to a limited degree the arts of agriculture, and developing the use of tools and utensils.

#### Aryan Immigrations

Somewhere about 3000 B.C. began the migration of the Aryan races from a centre somewhere in Asia or in Russia. The presumption is that they were races hardened by life in northern and comparatively unproductive regions, and wherever they moved they went as conquerors, but rarely as exterminators. The evidence of their kinship is to be found in the evidently common origin of their languages and the common characteristics in bone and skull structure, as witnessed by their burying grounds. Those who spread over Europe are commonly divided into four main groups, Celtic, Greco-Italian, Teutonic, and Slavonic.

The first made straight across Europe to the W., dominating, though not exterminating, the earlier inhabitants of modern France, Spain, and the British

Isles. The second pushed S. towards the Mediterranean, and by 1000 B.C. were masters of the Balkan and, less completely, of the Italian peninsulas. The Teutons, moving later than Celts and S. Aryans, gradually occupied Scandinavia and modern Germany, and first came into contact with the Roman Empire when it was almost supreme over the whole area W. of the Rhine and S. of the Danube at the close of the 2nd century B.C. The movement of the Slavonic group came still later. A group of Aryans, less advanced than the Greeks and Italians, had long been in occupation of Austro-Hungary and Rumania and the mountain regions E. of the Adriatic, but whether they were nearer akin to the Greeks and Italians or to the Slavs is uncertain.

#### Aegean and Greek Civilization

Recorded European history begins somewhere after 2000 B.C. with pre-Aryan races who dominated the islands and coasts of the Aegean Sea, and developed an advanced civilization to which the modern excavations principally in Crete and at Mycenae bear witness. Between 1500-1000 B.C. the Hellenic Aryans mastered all the S. portion of the Balkan peninsula, the islands of the Aegean, and the W. coasts—though only the coasts—of Asia Minor. Greek political organization developed rapidly in the form known as the city state. The system was fostered by geographical conditions. Hellas, the area under Greek occupation, did not form a political unity, but was broken up into a large number of small communities, often hostile to each other, though sharing a sense of common race and tradition.

Maritime and commercial development followed naturally, as there was easy communication by sea with earlier civilizations and state systems of W. Asia and Egypt. Between 1000-500 B.C. a high political organization was attained by many city states, together with a remarkable intellectual and artistic activity. The Greeks were so far in advance of the rest of the world that it has been said that "nothing moves in the world which is not Greek in origin." The statement is not strictly true. Moving forces, notably Christianity, have come out of the East; Celts, Romans, and Teutons have all made contributions; but the truth remains that the most active forces of progress had developed so far with the Greeks before the other westerns came in contact with them, that their more rapid advance was the direct outcome of the assimilation of Greek ideas.

Later than the Greeks in the Balkan peninsula, and developing more slowly, the Latin or Italian branch of the same or of a kindred stock found its way through the passes in N. Italy, crossed the Lombard plain, and pushed S., breaking across the Apennines into the W. plains. There they fought with the earlier inhabitants, notably the Etruscans, supposed by some authorities to have been of the same race as the makers of the Cretan civilization. On the W. of the Apennines they, like the Greeks, developed politically on the city state system, the Latin states warring with each other, but uniting against the Etruscans on the N., and the new tribes of their own kinsfolk, Sabellians or Samnites, who followed them. Greeks and Italians alike seem to have passed through a stage when each state had an hereditary monarch to a stage when the monarchy was absorbed by an aristocracy, displaced in its turn by a military despotism or tyranny.

#### The Rise of Rome

The primacy among the Latin states, whose league stretched S. from the Tiber, was won towards the end of the 6th century B.C. by the Romans, whose city, Rome, founded according to tradition in 753 B.C., was the barrier fortress holding the Tiber between Etruscans and Latins.

The next 200 years formed the most brilliant period in Greek history, in which first the Hellenes stemmed the westward pressure of the Asiatic powers, then carried their own political, literary, and artistic development to its highest point, and finally, led by Alexander the Great, shattered the great empire of Persia. The passion of each state for individual independence and their mutual jealousies prevented the Greeks from building up a common national structure. Neither Athens nor Sparta succeeded in establishing her own supremacy over the rest of the states; Macedon at last won the leadership about 340 B.C., but failed to create a united empire.

Meanwhile Rome, after a severe struggle, broke up the Etruscan power, which received its *coup de grâce* at the hands of Celtic invaders from the N., who penetrated as far as Rome (394 B.C.), but then rolled back beyond the Apennines to the plain of the Po. It would appear that long after the first Celtic migration, which had passed Italy by, a second great Celtic flood poured across Europe till it collided with its own Celtic predecessors. The result was that the S. wing, being beaten

back, forced its way into Italy and occupied the N. plain.

The Romans blocked the Celtic invasion of Italy, and, freed from the severe Etruscan pressure on the N., gradually came to dominate the Latin states and the kindred tribes, first known as Sabines and then as Samnites, who were pushed down on the E. and S., after the Latin occupation of the lands W. of the Apennines. Rome, compelled by her position to maintain a political organization adapted to military needs, won in Italy an undisputed ascendancy over her rivals.

Meanwhile Hellas had attained the high-water mark of her progress with Alexander the Great, whose death in 323 B.C. left his uncompleted empire to a century of disintegration. That same century, 300-200 B.C., saw the great struggle between Rome and the Semitic power of Carthage, which had established itself in N. Africa, to some degree in Sicily, and in Spain. Carthage was not decisively crushed until 202 B.C. Italy had supported Rome in the momentous conflict; the result of which was that not only was her ascendancy overwhelmingly confirmed in Italy, but her sway was also established in the Spanish peninsula, with its mixed population of Celts and pre-Celtic Iberians.

#### Roman Power Expands

During the next 170 years (200-30 B.C.) the dominion of the Roman republic expanded. The conquests of Julius Caesar in Gaul (58-50 B.C.) completed the subjection of all Europe W. of the Rhine and S. of the Danube, including the whole Celtic or partly Celtic area, except Britain, of which the part now called England was absorbed 100 years later. But all along the Rhine and the Upper Danube, the Teutons were now pressing upon the Roman frontier. The system which had built up the might of the Roman republic was not adapted to the administration of so heterogeneous an empire. Concentration of control was a necessity. Caesar gathered into his own hands the powers which enabled his genius to shape an imperial system under a single control.

For 400 years and more, the civilized world meant the Roman empire, which covered much of Europe and parts of Asia and Africa. On its borders there was incessant war; within it reigned the Roman Peace, save when the death of an emperor afforded a commander in some distant province the chance of snatching at the imperial purple.

W. of the Adriatic and the Rhine, the peoples of the continent

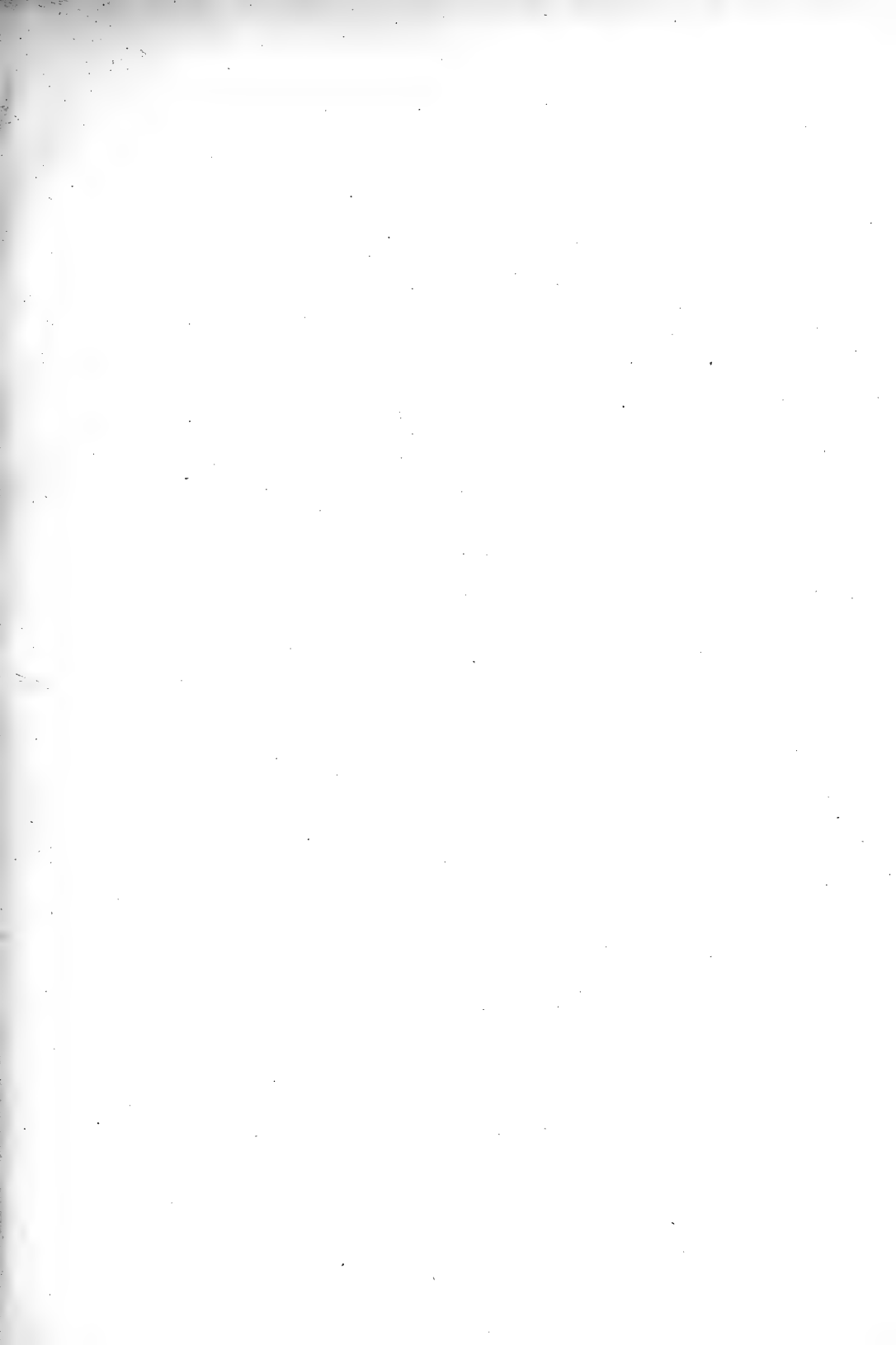
became thoroughly Latinised in language and political ideas, though across the Channel Latinism was little more than a superficial veneer which touched not at all either Celtic Ireland or the Celtic north of the island of Britain. In the Balkan peninsula, Hellenism held its own against Latinism except in the one trans-Danubian province of the empire, Dacia, the modern Rumania, planted with military colonies from Italy.

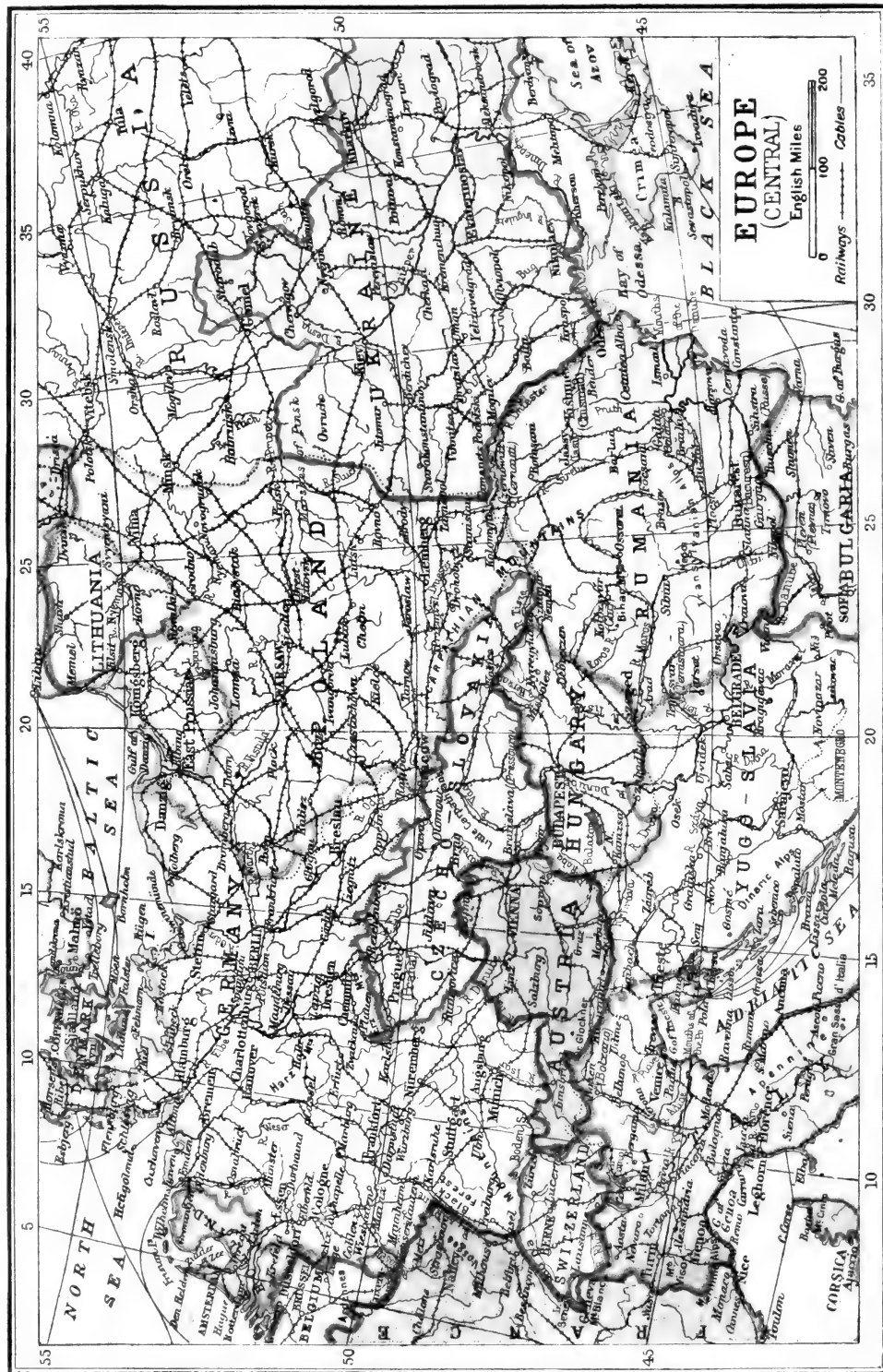
Towards the end of the 3rd century A.D. Teutonic hordes were surging against the Roman barrier, pressing now southward as well as westward upon the middle and lower Danube. At the close of the 3rd century the imperial system was reorganized by Diocletian, and a few years later by Constantine, who transferred the headquarters of the empire in 324 from Rome to Byzantium, which he renamed Constantinople. At the same time, after three centuries of repression and persecution, Christianity became the popular religion under the imperial sanction, and the ecclesiastical organization of the Church was officially recognized. One result of this was that Rome acquired the religious primacy of Christendom when her political primacy was lost.

#### Barbarian Irruptions

With the beginning of the 5th century, when the empire was parted into E. and W. under the two sons of Theodosius, the flood-gates of the imperial frontiers burst, and the Teutons swept over the barrier. The Visigoths burst into Italy under Alaric, and moved W. into S. Gaul and Spain, whither they had been preceded by Vandals and Sueves. Behind the Goths came a more terrible conqueror, Attila and his Huns, not Teutons, but Tartar hordes who for two generations had been moving across S. Russia from Central Asia. The Goths in the W. had chosen to profess allegiance to the empire; they helped the imperial armies to turn back the Huns at the battle of Châlons, 451.

The dispersal of the Huns made way for fresh Teutonic irruptions. The Ostrogoths, after overrunning much of the Balkan peninsula, turned W. and established a new Gothic dominion in Italy under Theodoric, who called himself a lieutenant of the single emperor now reigning at Constantinople. Then at the beginning of the 6th century the Teutonic Franks swept over the Rhine and made themselves masters of the land which still bears their name, though the Franks themselves never completely Teutonised the country,





Map of the states and boundaries of Central Europe, showing the changes resulting from the Great War. also territorial adjustments as fixed in 1924

Specially drawn for Harmsworth's Universal Encyclopedia



which remained persistently Latin. At the same time the native customs of the Franks in France, as of the Goths in Spain, fusing with the established Latin system, produced the social and political system known as feudalism. Other Teutonic tribes followed; Burgundians into the Rhône valley, and Lombards into the Lombard plain. The latter established their lordship over most of Italy, the Ostrogoths having been extirpated by the generals of Justinian, whose successors failed to retain the domination of the E. over the W. But nowhere did the Teutons effectually Teutonise populations already Latinised. Italy, France, and Spain remained essentially Latin, though Latinism hardly expanded E. of the Rhine or N. of the Danube.

With the rise of Mahomedanism in the 7th century, Europe was once more threatened with Orientalism. Early in the 8th century the Moors invaded Spain and drove the Christians into its N. corners. But when they flooded over the Pyrenees, their armies were shattered by Charles Martel at the battle of Tours or Poitiers, 732, and the tide was rolled back for ever behind the Pyrenees, though Saracen sea-rovers established a footing in Sicily. In the E. the Mahomedan onslaught had been hurled back 14 years before by the emperor Leo the Isaurian under the walls of Constantinople. Except in the S. of Italy all semblance of control by the emperor at Constantinople vanished from W. Europe.

#### The Empire of Charlemagne

Charlemagne now revived the W. Empire. He crossed the Pyrenees and drove the Moors S. of the Ebro. He completed his father's work of crushing the Lombards in Italy. His armies smote the heathen Saxons in the N. and the Bavarians in the S., and compelled them to adopt Christianity; still pushing E., they shattered the Mongolian kingdom of the Avars in Hungary. At the instance of the pope, Charles was crowned emperor in Rome on Christmas Day, 800. When he died in 814, the Elbe and the Adriatic were approximately the E. boundaries of the new Holy Roman Empire which he had created. The Danube still remained in effect the N. boundary of the Byzantine empire.

Under the grandsons of Charlemagne his empire parted into three domains, the W., which shaped itself into the kingdom of France, the E., which was German, and the intermediate, "middle," or Burgundian, which stretched from the North Sea to the Gulf of Lyons, and

included most of Italy, the S. of which, however, still belonged to the E. Empire. The crown of the Holy Roman Empire generally went with the E. or German kingdom. Burgundy broke up, part going with France and part with Germany, but never with a definite bond, while Italy became a congeries of dukedoms and counties over which the emperor on the other side of the Alps could exercise little authority. When the house of Charlemagne died out in Germany, the crown of the German kingdom, of the Holy Roman Empire, passed by election to the dukes of Saxony. The first, Henry the Fowler, was never crowned emperor; but he and his son, Otto the Great, stemmed the onrush of the third Mongolian horde which occupied Hungary, the Magyars, who nevertheless retained permanent possession of that tract.

#### The Middle Ages

The close of the 10th century, then, is the era of transition from the chaos of the earlier Middle Ages to what is generally more distinctively meant by the medieval period. During the 9th and 10th centuries the sea-rovers from Scandinavia had planted their colonies of Danes or Northmen in the British Isles and in the N. of France, and had shaped their own kingdoms in Norway, Denmark, and Sweden. In the 5th and 6th centuries the Teutonic English had conquered more than half the island of Britain, and in the 10th century England had become a fairly consolidated state.

France was on the way to consolidation under the house of Capet, which had displaced that of Charlemagne, but as yet the king of France was little more than a premier baron amongst many, some of whom ruled wider domains than the king himself. Spain was still mostly under the Saracen sway, though the Christian princes were soon to emerge from their northern fastnesses to win it back, establishing the kingdoms of Castile and Leon, Portugal, Aragon, and Navarre.

In the Spanish kingdoms, as in France, the king was hardly more than a premier baron. Central Europe regarded the German king as its head, though scarcely as its ruler, while to W. Christendom, in his character of emperor, he represented the idea of Christendom as a unity. The popes, as spiritual heads of Christendom, now began gradually to claim an authority higher than that of any lay potentate. Outside the empire on the E. the Slavs were establishing the Polish and Bohemian king-

doms, and had already given half the Balkan peninsula and the whole Danube basin a Slavonic character, though they owned the supremacy of the emperor at Byzantium. The latter, with his hardly held dominion in Asia, barred the door into E. Europe against the Mahomedans.

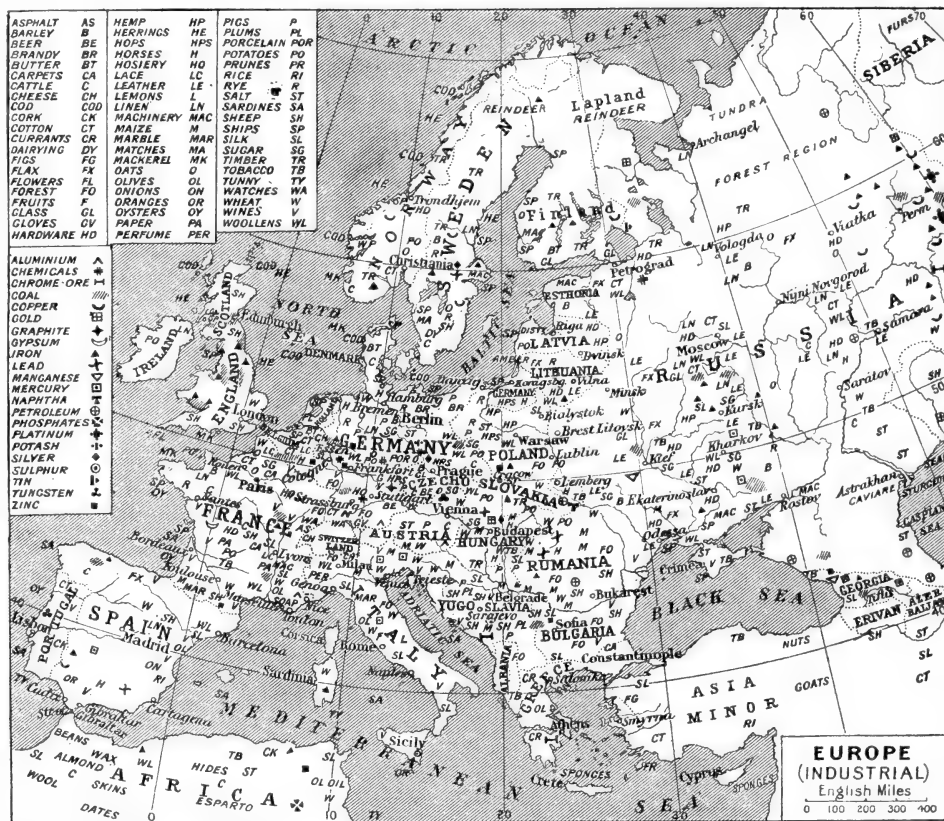
The new age was the age of feudalism, which before the end of the 11th century had established itself everywhere. Theoretically, the king owned every inch of soil in his kingdom. He had granted great tracts or small to his servants on condition of military service. They in turn had granted portions upon like conditions, while every one had settled husbandmen upon the soil, allowing them patches on condition of agricultural and other services to the lord.

But outside England, the tenant generally owed his services to his immediate lord and was bound to fight for him against anyone else, even the king. Hence if one of the king's men or barons accumulated enough territory, he had at his back an army of tenants with which he could levy war against the king. The royal authority depended upon the loyalty to the king of a proportion of the baronage. Thus the French dynasty and each German dynasty tried to expand the crown estates at the expense of the great barons. In France the counts of Anjou acquired by marriage the dukedoms of Normandy and Aquitaine as well as the independent kingdom of England. Essentially the Hundred Years' War between England and France in the 14th and 15th centuries was a struggle between the crown and the duke of Aquitaine, who happened also to be king of England. The final victory of the French crown, and its absorption of the duke's dominions, cleared the way for the final establishment of an absolute monarchy in France.

#### Pope and Emperor

In Germany, on the other hand, the monarchy was elective; each time that the succession changed, the new dynasty had to start afresh the absorption of feudatory territory, and consequently the German kings failed to establish absolute monarchy. Germany remained an aggregation of estates great and small, over which the emperor exercised little control.

The papacy again established its own supreme authority over the whole ecclesiastical organization of W. Christendom, and sought to assert that authority over all lay potentates. Within the empire, in Germany and in Italy, the struggle between the pope as the spiritual head of Christendom, and the



Europe. Map indicating the principal industries and occupations in the various countries of the Continent. The areas in which minerals are located and worked are also shown

emperor as its temporal head, helped the baronage to maintain their independence, since they could support emperor or pope as best suited themselves.

Europe, then, in the second as in the first half of the Middle Ages, shows nothing like the system of organized states to which we are accustomed. Through the Scots' War of Independence and the Hundred Years' War between England and France, the defined kingdoms of England, Scotland, and France were consolidating themselves during the four centuries which followed the Norman conquest of England in 1066. Spain shaped into a group of four separate kingdoms, the Moorish kingdom of Granada in the S., and the kingdoms of Portugal, Castile, and Aragon, to the last of which Sicily was attached in 1282. Central Europe—Germany—was only a loose confederation of states in a state of perpetual flux.

Italy became practically a collection of city states, in which there was developed an intellectual life

far in advance of that of the rest of the world, especially during the 14th and 15th centuries. On the N. of the empire lay the Scandinavian kingdoms; to the E. of it Poland, Bohemia, which had a connexion with the empire, and Hungary. S. of Hungary chaos for the most part reigned in the Balkan peninsula, though Byzantium held back the Asiatic invaders till its fall in 1453, when a Turkish dominion was established in the European continent. E. of Poland, the development of a Russian empire was prevented by the great Tartar incursion in the 14th century; but by the end of the 15th the Muscovite kingdom was shaping itself.

The latter half of the 15th century marks the transition from medieval to modern Europe. The union of the crowns of Castile and Aragon by the marriage of Ferdinand and Isabella, 1469, unified the Spanish monarchy. The imperial crown had passed to the Hapsburg, Frederick III of Austria, in whose dynasty it became hereditary. The use of gunpowder was

to revolutionise warfare. The voyages of Christopher Columbus and Vasco da Gama opened the ocean pathway to a new world in the W. and to the E., hitherto cut off from Europe by the Moslem wall which the crusaders had failed to break through. The intellectual revival in Italy received a new impulse from the revived study of ancient literatures following upon the fall of Constantinople and the dispersion of Greek scholars in the W., and men were beginning to challenge the doctrines of the Church itself.

With the 16th century the history of Europe becomes international, as it had never been before. The struggle of individual states for a general European ascendancy now begins, and against this effort the common interest in the preservation of a balance of power makes itself felt. Across this for 150 years cuts the religious struggle between Protestantism and Romanism, and this again is crossed by the struggle for dominion overseas.

The accident of marriages conveyed to one man, Charles V, the entire Spanish inheritance, including Sicily, S. Italy or Naples, the Netherlands, and the whole Hapsburg territorial inheritance in Germany, while he also succeeded his grandfather as emperor in 1519. A year later the floodgates of the Reformation were opened by Luther's defiance of the papacy. The German inheritance of the Hapsburgs was transferred to Charles's brother Ferdinand, who acquired for his own house the crowns of Hungary and Bohemia, and the Hapsburg monarchies became the barrier between Europe and the Turks. During Charles's reign Protestantism was established in Scandinavia, over the N. half of Germany, and in the N. half of the Netherlands; while it was planted as yet insecurely in England, Scotland, and France.

#### Religion and Politics

When Charles died in 1558 his son Philip II was ruling over the Spanish dominions and the Netherlands, Ferdinand was emperor, and a truce had been confirmed between the Protestant and Catholic states of the empire. By the end of the century Philip had virtually lost the N. Netherlands, which became the United Provinces of the Dutch Republic, while the Catholic S. still remained the Spanish Netherlands. England and Scotland had both become definitely Protestant, soon to be united under one crown; while France remained Catholic, with freedom of worship secured to the Protestants, and her foreign policy directed by purely political considerations irrespective of religion. Maritime ascendancy, once enjoyed by Italian city states, had first passed from them to Portugal and Spain, but was now decisively transferred to England and the Dutch states.

The struggle of the religions was fought out in the Thirty Years' War (1618-48), the emperor himself championing the Catholics, while Gustavus Adolphus of Sweden intervened on behalf of Protestantism. Its outcome left the division between Catholic and Protestant states in Germany very much where it had been at the beginning. It also broke the last attempt to establish an effective central control of the empire in the hands of the emperor. And meanwhile Spain had become practically a secondary power, while France, by Richelieu's policy, had developed a strong central government.

In the next phase, Louis XIV of France, a monarch whose abso-

lutism in his own country was almost unqualified, sought through a long series of wars, 1667-1713, to enlarge the borders of France and to make her the dictator of Europe. For 40 years the main resistance came from Spain and Austria, and from the little Dutch state under William of Orange, whose accession to the thrones of England and Scotland brought Great Britain into the European struggle, of which the last phase at this stage was the War of the Spanish Succession (1702-13). That war gave Spain herself to a Bourbon, Philip, a grandson of Louis, who was himself succeeded on the throne of France by his great-grandson Louis XV. It also transferred the Spanish Netherlands to Austria, together with the Two Sicilies.

Meanwhile within Germany the electorate of Brandenburg had been erected into the kingdom of Prussia (1701); and outside, England and Scotland had been incorporated in the kingdom of Great Britain (1707), while in the E. Russia had at last been organized into a consolidated dominion by Peter the Great, and Sweden, under Charles XII, had made her last effort to retain among the European powers the position won for her by Gustavus Adolphus. Britain had now emerged as the supreme maritime power, and established naval bases at Gibraltar and Minorca. The reign of Louis XV in France (1713-74) covers an era of protracted European struggles. The last aggressive effort of Turkey was crushed in 1718; Russia established herself on the Baltic and the Black Sea, and extended her boundaries eastwards.

#### Prussia and Silesia

The War of the Polish Succession (1733-38) set up a Bourbon dynasty in the Sicilies. The War of the Austrian Succession (1740-48) saved the Austrian dominion from disintegration, except for the annexation of Silesia by Frederick II of Prussia—a robbery which led the way to a regrouping of the powers in the Seven Years' War (1756-63). Great Britain, the former ally of Austria, now supported Prussia, which had to defend itself against the French on the W., the Austrians on the S., and the Russians on the E. Great Britain's part in the war was mainly on the seas and beyond them, where she fought the French in America and in India, and in effect turned them out of both. In Europe, the war confirmed Prussia as a first-class power, still in possession of Silesia; but no fighting was needed when, in 1772, the tsarina

Catherine arranged with Frederick of Prussia and with Austria the first partition of Poland, a partition carried farther in 1793 and 1795, when the whole of Poland was absorbed by one or other of the three.

The development of the last 300 years had established despotic governments in every state in the European continent, large or small, with the exception of Switzerland and Holland. The despots were generally well disposed towards their subjects. Many tried to improve the conditions of their people, and some succeeded. But, broadly speaking, most of the populations lived actually or approximately in serfdom. Political liberty was non-existent, and between the classes there was an almost impenetrable social barrier, while the burdens of taxation and service pressed most heavily upon those least capable of supporting them.

#### The French Revolution

The summoning of a popular assembly in France—the states-general of 1789—in the hope of discovering a panacea for the imminent financial ruin of the country, proved to be the first step in a wide revolution. Successive assemblies passed from advocating the abolition of privileges to demanding the abolition of the privileged. The extremists captured the control of the government, first emasculated and then wiped out the monarchy, and went on to proclaim themselves the liberators of Europe from the tyranny of monarchs and aristocrats.

Great Britain, whose constitutionalism had been the model of the reformers before they were swept away by the revolutionary tide, was swung into the vortex when the new republic tore up treaties, and set about annexing the Austrian Netherlands in 1793. Long before the terrors of the revolution within France had exhausted themselves, the armies of the republic, reckless of established methods, were facing and routing the orthodox armies of the monarchies. Prussia and Spain soon retired from the struggle; Bonaparte's Italian campaigns broke Austria. Bonaparte betook himself to Egypt; Britain, fighting on alone, won the mastery of the Mediterranean; Austria returned to the attack, supported by Russia. The return of Bonaparte and his establishment as First Consul of France was followed by the shattering of the new coalition, and even by the accession of Great Britain to the peace of Amiens, 1802.

In 1803 the Franco-British duel was renewed; two years later a new coalition was formed. Nelson

sealed the naval supremacy of Great Britain at Trafalgar, 1805, but Napoleon, now emperor of the French, shattered the new coalition at Austerlitz. Prussia, aroused at last, took up the challenge and was crushed at Jena, 1806, and Napoleon made his peace with Russia at Tilsit in 1807, and set about the reconstruction of Europe according to his own fancy. His attempt to appropriate the Spanish peninsula brought Great Britain into the war for the first time as a military power, 1808. For five years Napoleon's generals strove in vain to drive the British into the sea. But Napoleon quarrelled with the tsar, and his Moscow expedition in 1812 ended in irretrievable disaster. The uprising of the peoples rather than of the governments overwhelmed him, he was compelled to abdicate in 1814, and though he reappeared to make a last bid for victory, he was finally crushed at Waterloo, 1815.

The congress of Vienna restored the map of Europe so that the state boundaries were much as they had been in 1792, except that the Netherlands were formed into a new kingdom. The old dynasties were replaced and the old despotisms renewed, the former states of the empire forming the German Confederation. But the French Revolution had kindled new ideas of liberty, partly democratic, partly nationalist, and despite the efforts of Metternich, those movements could not be crushed. Greece broke free from her subjection to Turkey; France turned out the Bourbons and established the constitutional Orleans monarchy in 1830. The S. Netherlands separated from Holland in 1839 and became the Belgian kingdom. Liberals and reactionaries did battle in Spain and Portugal.

#### **Austria and the German Confederation**

Then in 1848 came the Year of Revolutions. In almost every country, nationalist, constitutionalist, or democratic movements came to a head. Generally, though not always, the Reaction was for the time victorious. France made herself into a republic, but in five years the nephew of Napoleon had turned the republic into the Second Empire. Limited constitutions were conceded in sundry German states. Austria kept her grip on the diverse portions of her empire, and though the title of the Holy Roman Empire had been dropped since 1806, she still retained her place as leader, or as joint leader with Prussia, of the German confederation. The mutual jealousies and distrust between Great Britain and Russia, the causes of which

were more Asiatic than European, were a constant disturbing factor in European affairs.

The three great movements afoot were towards the liberation of the Balkan peninsula from Turkish rule, towards the unification of Italy, and towards the unification of Germany under the headship of Prussia. The rising of N. Italy under the leadership of Victor Emmanuel, king of Sardinia, supported by Napoleon III, in 1859, liberated most of N. Italy from Austria and from the temporal control of the papacy and created the kingdom of N. Italy. The revolt of Sicily and Naples against the Bourbon dynasty in 1860 was followed by the adhesion of S. Italy to the N. kingdom, and in 1861 the united kingdom of Italy was established, though Austria still held the N.E. corner and Rome still belonged to the pope. In 1871, however, it was united to the new kingdom of which it was made the capital.

#### **Policy of Bismarck**

Bismarck organized the Prussian military power, contrived the annexation of Slesvig and Holstein from Denmark, and procured the Seven Weeks' War with Austria in 1866, which in effect ejected Austria from the German confederation and gave Prussia decisive ascendancy therein. Incidentally, Italy was rewarded for her assistance to Bismarck by the acquisition of Venetia. Bismarck's policy achieved its triumph with the Franco-Prussian War of 1870-71. The recovery of the Rhine provinces from France was accompanied by the recognition of the king of Prussia as German emperor and by the consolidation of the new German Empire under Prussian direction, with a machinery which, for the first time in Germany's history, brought her under a single control and made her the first military power in Europe. Another outcome of the war was the establishment of the third republic in France.

Turkish misrule was the excuse or justification of the wars with Turkey upon which Russia entered in 1853 and 1877. In both, British intervention was responsible for the preservation of Turkey, but those wars brought about the virtual independence, first of Rumania and then of the Slav states of Bulgaria, Serbia, and Montenegro, while Bosnia and Herzegovina were placed under Austrian administration, paying the way for annexation after an interval of 30 years. The outstanding features, however, of the European situation in the latter years of the 19th

century were the alliance of the three emperors, and the substitution for it of the alliance of the three powers, Germany, Austria-Hungary, and Italy, which was answered by the alliance between France and Russia. The settlement of outstanding differences between Great Britain and France in 1905 prepared the way for the Triple Entente between Great Britain, France, and Russia, which became an accomplished fact in 1907, while its solidarity was proved to the great dissatisfaction of Germany in 1911 by the British support of the French in connexion with the Agadir incident. The Balkan Wars of 1912-13 liberated the Balkan States from the last relics of Turkish sovereignty, but failed to establish a concord among them, whereof the fruits were later to become apparent.

Two more events prior to 1914 have here to be noted. In the 15th century Denmark, Norway, and Sweden had been united under one crown; in the 16th Sweden had separated herself, but Norway had remained attached to Denmark. At the European reconstruction in 1815 Norway had been taken from Denmark and attached to Sweden. The union, however, had never been harmonious or satisfactory to Norway, and in 1905 she procured her establishment as a separate kingdom. In 1908 a revolution in Portugal expelled the reigning dynasty, and changed Portugal into a republic.

#### **The Great War, 1914-1918**

In 1914 Europe was again flung into the melting-pot, from which it had not fully emerged at the close of 1920. The Kaiser, with the carefully educated public opinion of Germany at his back, planned to bring on at Germany's own time a world conflict which should result first in the subjection of France and the paralysis of Russia, and ultimately in the collapse of the British Empire. Reckoning that she would have only Russia and France to deal with immediately, Germany prepared for an Austro-Russian quarrel in the Balkans which should either at once establish Austro-German supremacy in the Near East or precipitate the great conflict in which she anticipated prompt and overwhelming triumph.

But while Russia, necessarily joined by France, met the challenge, Germany's violation of Belgium brought Great Britain decisively into the struggle. For four years Europe was the stage of the most terrific and devastating war in the annals of mankind. In the west the German rush just failed to reach Paris, and a long battle-

line of entrenchments was established from the Swiss border to the North Sea. In the east the Russian invasion of German territory was swept back. Turkey threw in her lot with the Central Powers; then Italy, which at first stood neutral, broke from the Triple Alliance and joined the Entente Powers. Bulgaria joined the attack on Serbia; in 1916 Rumania came into the fray with disastrous results for herself. The tide of the Russian war surged backwards and forwards over Poland and Galicia.

In 1917 came the Russian revolution, first wearing a constitutional aspect, then developing into the Bolshevism which freed the Central Powers from the Russian grip which they had hitherto failed to break. The German submarine campaign drew the U.S.A. into the struggle. Before the U.S. armies could come in, the Germans in the spring of 1918 launched the concentrated attack in the west. It failed by a hair's-breadth to attain its object, and then the decisive counterstroke was delivered which forced Germany to sue for the armistice, of which the terms were accepted on Nov. 11.

The German Empire went down. Therein every state, from Prussia downwards, ejected its hereditary dynasty. Austria-Hungary was dissolved into its component parts—Czecho-Slovakia, Yugo-Slavia, Hungary, Austria; Italy recovered what remained of Italia Irredenta, and France her lost provinces. Poland was reconstituted. In Russia the tsardom had been horribly swept away, but the whole empire was torn in fragments under the Bolshevik régime.

Rumania was greatly enlarged as the result of the addition of Bessarabia, Bukowina, and Transylvania; Turkey was practically confined to Constantinople, Greece receiving from her most of Thrace. In Nov., 1920, the Adriatic question was settled, Fiume being declared independent, and a new frontier being drawn between Italy and Yugo-Slavia. See N.V.

A. D. Innes

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**Europium.** Rare element discovered by E. A. Demarçay in 1896. Found associated with samarium, it is separated by fractional crystallisation. It was first isolated in 1901. Its symbol is Eu.

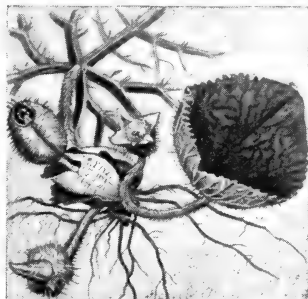
**Eurotas.** River of ancient Laconia, Greece, now known as Iri. It discharges into the Gulf of Laconia after a course of 60 m. Sparta stood on its banks.

**Euryale ferox.** Aquatic perennial herb of the natural order Nymphaeaceae. It is a native of the E. Indies. Its circular floating leaves are 1 ft. to 4 ft. in diameter, the rich purple underside, like the sepals of the purple flower, being protected by numerous spines. The fruit is a round berry containing numerous farinaceous seeds, which are eaten after being baked in sand. The Chinese cultivate the plant for these seeds.

In Greek mythology Euryale is the name of one of the Gorgons (*q.v.*). *Pron.* U-ri-alee.

**Eurydice.** In Greek mythology, wife of the poet Orpheus. When she died Orpheus went down into Hades, and by the power of his

lyre induced Pluto, ruler of the underworld, to restore his wife to him, on condition that he did not look behind until he reached the earth again. In his eagerness to see



Euryale ferox. Leaves and flowers of the East Indian aquatic plant

if his wife were following, he forgot the condition, and Eurydice was lost to him for ever. See Orpheus. *Pron.* U-riddy-see.

**Eurymedon.** Ancient name of the Köprü Su, a river of Pamphylia, Asia Minor. It flowed into the Mediterranean, W. of the Taurus Mts., and at its mouth the Athenians under Cimon (*q.v.*) defeated the Persians 466 B.C.

**Eurypterida** (Gr.

*eury*, broad; *pteron*, wing). Extinct scorpion-like animals of the class Arachnida (*q.v.*). The body is rather flat, sometimes as much as 6 ft. in length, covered by a thin horny covering (carapace) and ornamented by fine, scale-like markings. The head is semicircular, consisting of six segments fused together, and six pairs of appendages are attached to the head-shield, the last pair being adapted as swimming paddles. The abdominal portion is long, of 12 segments, the first six bearing plate-like appendages with leaf-like gills. The last segment is a tail-plate, sometimes produced into a long spine. The upper surface of the head-shield has two eye-spots



Eurydice. By disobeying the command of Pluto Orpheus loses the wife whom he had nearly rescued from Hades

From the painting, Orpheus and Eurydice, by G. F. Watts, B.A.



near the centre, and a large pair of faceted eyes near the margin. Eurypterids originally inhabited the sea, but became adapted to brackish and possibly to fresh-water conditions. Fossils are found in Silurian, Devonian, and carboniferous strata.

**Eusebius** (c. 264–340). Church historian. Often called Eusebius Pamphili, he was probably a native of Palestine and spent his youth at Caesarea. After the martyrdom of his teacher Pamphilus, he took refuge in Egypt for some years, and about 313 was appointed bishop of Caesarea by his patron, the emperor Constantine the Great. At the council of Nicea, 325, though himself orthodox, he showed leanings towards the Arian party. His historical writings, especially *Præparatio Evangelica* (selections translated by H. Street, 1842), *Demonstratio Evangelica*, and *Historia Ecclesiastica*, entitle him to be called the father of ecclesiastical history. The *Historia* has been translated into English by A. C. McGiffert, 1890.

**Euskirchen**. Town of Germany, in the Prussian Rhine prov. It stands on the Erft and is a rly. junction, 20 m. S.W. from Cologne. Textiles are manufactured and beer is brewed, other industries being tanning and the making of chemicals. Pop. 11,350.

**Eusol**. Solution containing free hypochlorous acid. Introduced 1915 as an antiseptic in treating wounds, it is prepared by shaking 25 grams of a mixture of bleaching powder and boric acid (called eupad) with one litre of water and filtering the solution after some hours.

**Eustachian Tube**. Tube leading from the upper part of the pharynx to the tympanic cavity of the ear. Its function is to maintain equal atmospheric pressure on both sides of the ear-drum. It is ordinarily closed, but is opened by each act of swallowing. Blocking of the tube, as in catarrhal conditions or from the growth of adenoids, leads to bulging of the membrane and partial deafness. If the passage does not open when the catarrh disappears, the obstruction can usually be removed by blowing air into the tube or passing a fine catheter. When due to adenoids, the growth is usually removed. The tube is named after Bartolommeo Eustachio (d. 1574), an Italian anatomist. *Pron.* U-stä-kyan. *See* Ear.

**Euston Road**. London thoroughfare. With Marylebone Road on the W. and Pentonville Road on the E., it forms part of the New Road laid out in 1754–56 to connect Paddington and Islington, and extends from Great Portland Street rly. station to King's Cross.

In Euston Square is the entrance to the terminus of the L. & N.W.R. An obelisk 45 ft. in height is to be erected between the terminus and Euston Road by the L. & N.W.R. as a memorial to their employees who fell in the Great War.

St. Pancras is the terminus of the M.R., and King's Cross that of the G.N.R. The Metropolitan Rly. has a station (Euston Square) at the Gower Street corner, and the Hampstead and City and S. London Rlys. have stations at the back of Euston Square and at King's Cross. In Euston Road are the (new) church of St. Pancras, built 1819–22, a modified copy of the Erechtheum at Athens; and Unity House, headquarters of the National Union of Railwaymen.

**Eutaw Springs**. River of S. Carolina, U.S.A., a tributary of the Santee river. Near here on Sept. 8, 1781, was fought an indecisive battle in the War of Independence. The American force under General Greene gained an early success over the British under General Stuart, but the latter successfully withstood a second onslaught.

**Eutectic** (Gr. *eu*, well; *tēkein*, to melt). Term introduced to denote a condition of equilibrium which was found to exist in solution of common salt, and since extended to include similar conditions.

Between 1875–78 Guthrie investigated the freezing point of salt solution. He found that, no matter what the initial strength of the solution, there was a certain concentration (23.5 p.c. of salt) and temperature (–22° C.) when the solution completely solidified. This he called the eutectic, which has always for the same solute and solvent a constant composition, but is not a chemical composition. This helped to explain the state of metals in alloys. Those which are looked upon as “solid solutions” exhibit eutectic properties. Pig iron, for example, is eutectic when it has a proportion of 4.3 p.c. of carbon. Plumbers' solder, consisting of two parts lead and one part tin, is a eutectic alloy, solidifying at a lower temperature than any other alloy of these metals, which constitutes its utility in “wiping” a joint.

**Euterpe** (Gr., the well-pleasing). In Greek mythology, one of the nine muses. Her special province was lyric poetry. *See* Muses.

**Euthanasia** (Gr. *eu*, well; *thanatos*, death). Easy or comfortable death; in medical language, the employment of means calculated to render the death of those suffering from painful and incurable diseases as painless as possible. Induced euthanasia was

advocated by Plato, and was common under the Roman emperors, many of Pliny's friends being recorded as submitting to it. In the island of Ceos (Zea), in the Cyclades, euthanasia was enjoined on citizens over 60. In old Marseilles it is said that the authorities were memorialised in cases of serious illness, or even of dire misfortune, as to the advisability of euthanasia. In More's ideal state, Utopia, euthanasia was practised.

**Eutheria** (Gr. *eu*, well; *thērion*, beast) OR PLACENTALS. One of the three sub-classes of Mammalia, the other two being the prototheria or monotremes and the metatheria or marsupials. Of these the prototheria are oviparous; the metatheria bring forth their young prematurely and nurture them in a pouch; and the eutheria produce more or less perfectly developed young, which during gestation are vitally united to their mother by a placenta. *See* Mammal.

**Entropius**. Roman historian of the 4th century A.D. He was the author of *Breviarium ab urbe condita*, a short history of Rome from its foundation to A.D. 364. The work has little historical value, but the simplicity of its style has made it a favourite text-book for beginners in Latin.

**Eutyches** (5th century A.D.). Founder of the Eutychnian heresy. Superior of a monastery at Constantinople, he taught that the human nature of Christ was absorbed in the divine, and therefore non-existent, even His body not being truly human. For this he was condemned by a synod at Constantinople in 448, restored by the “Robber” council of Ephesus in 449, but finally condemned by the council of Chalcedon in 451, and afterwards banished. *Pron.* U-ty-keez.

**Eutyclus**. Name of a young man who, having fallen into a deep sleep while Paul was preaching at Troas, fell from the third loft, and was healed or restored to life by the Apostle (Acts xx, 9–10).

**Euxine**. Ancient name of the Black Sea, the Pontus Euxinus, or hospitable sea. It was originally called Axenos, inhospitable, from the prevalent storms, and the hatred of strangers shown by the dwellers on the coasts. The name was probably changed when increasing commerce and the establishment of Greek colonies made it better known. *See* Black Sea.

**Evagoras** (d. 374 B.C.). King of Salamis in Cyprus. An able ruler, he greatly developed the naval power of his kingdom. He was on friendly terms with the

Athenians, especially with the Athenian admiral Conon (*q.v.*), and it was due to him that Conon was helped by the Persian fleet at Cnidus (*q.v.*) in 394. Subsequently, in the war between Evagoras and the Persians, the Athenian fleet came to his aid. The war with Persia dragged on for several years, and was eventually ended by a settlement which guaranteed Evagoras his kingdom.

**Evagrius** (c. 536-600). Byzantine eccles. historian. Born at Epiphania, in Coele-Syria, he flourished during the reigns of the emperors Tiberius and Maurice. At first he studied law at Antioch, whence his surname Scholasticus (advocate). One of the continuators of Eusebius, his history covers the period from the council of Ephesus, 431, down to 593. It throws light chiefly on the religious controversies of the period, but also on secular affairs.

**Evander**. Legendary Italian hero. Some time before the Trojan war he was said to have conducted a band of colonists from Pallantium in Arcadia to Italy, where he founded a settlement on the Palatine hill. Writing and other arts and the institution of the Lupercalia in honour of the Arcadian god, Pan, were ascribed to him. Evander is really the Italian Faunus (the favourable one), to whom the Greek Pan also corresponds, and the story of the Arcadian colony, like much in Roman mythology and legend, is due to Greek influence.

**Evangelical** (Gr. *evangelikos*, of the Gospel). Term applied to the two religious revivals within and without the Anglican Church in the 18th century. The movement led by John Wesley (*q.v.*) became exterior to the Church. The other movement is attributed to the teaching of William Law, author of *The Serious Call*, and with it are prominently associated the names of Henry Venn, James Hervey, Joseph and Isaac Milner, John Newton, William Cowper, Richard Cecil, Thomas Scott, Henry Martyn the missionary, Charles Simeon, John Thornton, and his fellow members of "the Clapham sect," William Wilberforce, and Selina, Countess of Huntingdon. The movement has left its mark on hymnology, notably in the compositions of Toplady and the hymnal of E. H. Bickersteth. With its views are associated such societies as the C.M.S., Church Association, Church Parochial Mission, Y.M.C.A., Y.W.C.A., and many organizations for bringing the Gospel message to the poor.

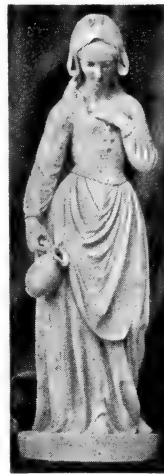
The Evangelicals emphasised

original sin, the efficacy of the Atonement, the need of personal conversion, justification by faith and veneration for the letter of the Scriptures. What is known today as the Low Church party in the Church of England (to be distinguished from the Low Church party of the period preceding the Evangelical revivals) is usually called evangelical; it holds many things in common with English Nonconformity, and its leaders meet annually at the Keswick Convention and the Islington Conference. The term evangelical is applied to the United Church in Germany and to the Jansenists of France. It forms part of the title of the world's Evangelical Alliance; the Evangelical Association of North America, founded early in the 19th century by a Lutheran named Jacob Albrecht; and the Evangelical Union, constituted in Scotland in 1843 by the Rev. James Morison, of Kilmarnock. See *The Evangelical Revival in the 18th Century*, J. H. Overton, 2nd ed. 1900.

**Evangelical Alliance**, WORLD'S. Protestant organization founded in Liverpool in 1845, and incorporated in 1912. Its objects include the maintenance of evangelical principles, the promotion of Christian unity, the holding annually of a universal week of prayer, the relief of persecuted Christians in all lands, and the defence of religious liberty. Its work is carried on by means of international conferences in different countries, by bringing influence to bear on governments, and by the formation of public opinion. Its organ is *Evangelical Christendom*, published bi-monthly in London, and its central office is 19, Russell Square, London, W.C.

**Evangelical Union** OR MORISONIANS. Scottish Presbyterian body. It was founded by the Rev. James Morison, 1816-93, of Kilmarnock, and other seceders from the United Secession Church in 1843. Soon afterwards they were joined by ministers expelled from the Congregationalist Union. They rejected the doctrine of predestination, and maintained universal redemption and the freedom of the will. The churches were independent and free to adopt Presbyterian or Congregationalist forms of government. All ministers had to be total abstainers. The bulk of the congregations joined the Congregational Union (of Scotland) in 1896.

**Evangeline**. Narrative idyllic poem by H. W. Longfellow. First published in 1847, the story is a romantic account of the deportations in 1755 of the French Acadians from Acadie (Nova Scotia), owing to their lack of sympathy



Evageline, the Acadian heroine  
From a statue by Sarah Terry

with their British and Protestant rulers. It is a tender, tragic romance, beautifully told, and one of the most successful instances in English of the sustained use of hexameters. The poem is named from the heroine, who was first to have been Gabrielle, a name later adapted as Gabriel for the hero. A monument to her was unveiled at Grand Pré, Nova Scotia (*q.v.*), Aug., 1920.

**Evangelist** (Gr. *evangelistēs*, proclaimer of glad tidings). Originally one chosen by the apostles to preach the Gospel where it was unknown. Theodoret first restricted the name to travelling preachers; Oecumenius first applied it to the authors of the four Gospels; to-day it is also used for missionaries and revivalist preachers. (See Eph. 4; Acts 8 and 21; 2 Tim. 4.) The four living creatures referred to in Ezek. 1 and 10, and Rev. 4, were regarded by Jerome as symbols of the four evangelists—the man, Matthew; the lion, Mark; the ox, Luke; the eagle, John. Irenaeus assigned the lion to John and the eagle to Mark; Augustine and Bede, the lion to Matthew and the man to Mark. See *Apostle*; *Gospel*; *Preaching*.

**Evan Harrington**. Novel by George Meredith. After serial appearance in *Once a Week*, as *Evan Harrington*, or *He Would be a Gentleman*, it was published in volume form in 1861. It is one of the author's best stories, including in Evan's sister, the Countess de Saldar, one of his triumphs of portraiture. Evan is the son of a tailor, the great Mel, and the whole Harrington family is founded on members of Meredith's paternal family.

**Evans, Sir ARTHUR JOHN** (b. 1851). British archaeologist and numismatist. Born at Hemel Hempstead, the eldest son of Sir John Evans (*q.v.*), he studied at Harrow, Oxford, and Göttingen. He travelled in Finland and Russian Lapland, 1873-74, and was engaged in researches in the Balkan peninsula between 1875-82. From 1884-1908 he was keeper of the



Sir Arthur Evans,  
British archaeologist

*La Fayette*

Scripta Minoa, 1909. His excavation of the Minoan palace of Cnossus in 1900-8 elucidated the Aegean civilization first revealed by Schliemann at Mycenae. He became extraordinary professor of prehistoric archaeology at Oxford in 1910, and was president of the British Association, 1916-17. In 1911 he was knighted.

**Evans, EDWARD RADCLIFFE GARTH RUSSELL** (b. 1881). British sailor and explorer. The son of a barrister, he was educated at the Merchant Taylors' School. Entering the navy in 1897, he became lieutenant in 1902, and was navigating officer to the Antarctic relief ship *Morning*, 1902-4, making two voyages to the S. Polar regions to the relief of the *Discovery* when she was frozen in MacMurdo Strait. He joined the British Antarctic Expedition as second in command in 1909, and after the death of Captain Scott in 1912 he brought it back. A commander in the navy, on the outbreak of the Great War he took part in the bombardment of the Belgian coast in 1914. He was in command of the *Broke* when, in 1917, that vessel and the *Swift* defeated six German destroyers. He was promoted captain in 1917, and received the D.S.O. See Antarctic Exploration.



E. R. G. R. Evans,  
British explorer

*Russell*

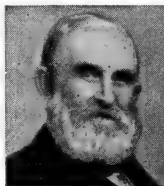
**Evans, SIR GEORGE DE LACY** (1787-1870). British soldier. Born at Moig, co. Limerick, Ireland, he entered the Indian army in 1806 and in 1812 joined the 3rd Dragoons in the Peninsula. He was present at Vittoria, Pampeluna, and Toulouse. In the American War he took part in the seizure of Washington, and in the operations before New Orleans, and, returning



Sir G. de Lacy Evans,  
British soldier

to Europe, was present at Waterloo. After a short time in Parliament as an advanced radical, he commanded the legion recruited in England to assist Queen Isabella of Spain against the Carlists. The legion, though ill-equipped and neglected by the Spanish government, fought well under Evans's command, 1835-37. Evans's last active service was in the Crimean War, from which, however, he was invalided home. He resumed his seat in the House, received the thanks of Parliament, and was made a G.C.B. He died Jan. 9, 1870.

**Evans, SIR JOHN** (1823-1908). British archaeologist and numismatist. Born at Britwell Court, Buckinghamshire, Nov. 17, 1823, in 1840 he entered his uncle's paper mills at Hemel Hempstead. He was president of the Geological Society, 1874-76; the Numismatic Society, 1874-1908; the Society of Antiquaries, 1885-92; and the Anthropological Institute, 1877-79. Admitted a Fellow 1861, he was treasurer of the Royal Society, 1878-98. He wrote *Coins of the Ancient Britons*, 1864, with supplement, 1890; *Ancient Stone Implements of Great Britain*, 1872, 2nd ed. 1897; *Ancient Bronze Implements of Great Britain and Ireland*, 1881. He died May 31, 1908. His collection of 1,700 coins was presented to the British Museum by his son in 1919.



Sir John Evans,  
British archaeologist

*Elliott & Fry*

**Evans, MARIAN OR MARY ANN** (1819-80). Maiden name of the British novelist better known as George Eliot (*q.v.*).

**Evans, OLIVER** (1755-1819). American inventor. Born at Newport, Delaware, he entered his brother's milling business, and invented and fitted up various appliances for economising time and labour. The machinery was worked by water power, and revolutionised the grinding of corn. Americans claim that Evans designed the first steam engine on the high-pressure principle, and it is agreed that his plans, sent to England, were seen by Trevethick. Although never so successful as Watt, he was one of the pioneers of steam locomotion, and ranks as one of the most ingenious mechanics that America has produced. He died at New York, April 25, 1819.

**Evans, ROBLEY DUNGLISON** (1846-1912). American sailor. Born in Virginia, Aug. 18, 1846,

he received his naval training in the U.S. Naval Academy in 1863. He saw considerable service during the Civil War, being wounded in the land attack on Fort Fisher, 1865. In 1891 he was in command of the Yorktown off Valparaiso, where his attitude towards Chile, between whom and the U.S.A. relations were at the time strained, earned him the nickname of Fighting Bob. Promoted captain in 1893, in the Spanish-American War he commanded the Iowa under Admiral Sampson off Santiago, and fought Cervera's fleet, July 3, 1898. Promoted rear-admiral 1901, he was commander-in-chief of the Asiatic station in 1902. He died Jan. 3, 1912.

**Evans, SIR SAMUEL THOMAS** (1859-1918). British lawyer and politician. Born at Neath, Glamorganshire, he graduated at London University, and became a solicitor in 1883. Practising in his native town, he was elected M.P. for mid-Glamorganshire in 1890, which constituency he represented for twenty years. He became a barrister in 1891, a Q.C. in 1901, was recorder of Swansea from 1906-8, and in 1908 was appointed solicitor-general and knighted. In 1910 he left Parliament to become president of the probate, divorce, and admiralty division, which, after the outbreak of the Great War, included the business of the prize court. He died at Brighton, Sept. 13, 1918.



Sir Samuel Evans,  
British lawyer

*Russell*

**Evanston.** City of Illinois, U.S.A., in Cook co. It stands on Lake Michigan, 13 m. N. by W. of Chicago, and is served by the Chicago, Milwaukee and St. Paul, and the Chicago and N.W. Rlys. It is the seat of the Northwestern University, and contains various educational institutions. Settled in 1835, it was incorporated in 1863, and received a city charter in 1892. Pop. 29,305.

**Evansville.** City of Indiana, U.S.A., the co. seat of Vanderburg co. On the Ohio river, 150 m. W. by S. of Indianapolis, it is served by the Louisville and Nashville and other rlys. A port of entry, it carries on a thriving trade in coal, flour, and tobacco, and has cotton, woolen, and flour mills, in addition to foundries, machinery works, and cigar, glass, and leather factories. Evansville dates from 1816, and became a city in 1847. Pop. 77,631.

**Evan-Thomas**, SIR HUGH (b. 1862), British sailor. Born Oct. 27, 1862, he entered



Sir H. Evan-Thomas,  
British sailor  
Russell

in 1875. He was flag-captain to the Channel fleet, 1903-4, and private secretary to the first lord of the admiralty, 1905-8. From 1910-12 he was in command of the R.N. College, Dartmouth, being A.D.C. to the king, 1911-12, when he was promoted rear-admiral. Rear-admiral of the first battle squadron, 1913-14, he commanded the fifth battle squadron in the battle of Jutland. Knighted for his services, he was commander-in-chief at the Nore, 1920-23.

**Evaporation** (Lat. *e*, from, out; *vapor*, vapour). Name commonly given to the process by which a liquid, and less commonly a solid such as carbonic acid snow, changes into a state of vapour. Evaporation may be said to be a function of heat and pressure. Liquids may evaporate at all temperatures; under the application of heat or the removal of pressure from their surfaces, they evaporate more quickly. At a given temperature evaporation in a closed vessel ceases when a certain pressure of vapour is attained, for condensation of the vapour balances the evaporation of the liquid.

The rate of evaporation of a liquid depends upon the area of the surface exposed, the freedom of the space surrounding it from vapour, and the difference between the vapour pressure and the external pressure. Thus a given volume of a liquid evaporates more quickly in a shallow dish than a deep one, in a dry atmosphere than a damp one, and on a warm day than a cold one. The movement of the atmosphere over the surface of the liquid also increases the rate of evaporation, as the evaporated particles are carried away.

In converting a liquid into a vapour at the same temperature, heat has to be supplied. In other words, heat is absorbed in the process of evaporation. The quantity of heat that has to be supplied to one gram of liquid at the boiling point without changing its temperature is called the latent heat of vaporisation. This is the same thing as the quantity of heat given out by one gram of the vapour at boiling point, when condensing to a liquid at the same temperature.

Evaporation of water is of great importance in nature. In spring

and summer wind and rising temperature increase evaporation, while in autumn and winter falling temperature and cold spells decrease the capacity of the air for holding water particles, causing mists, fogs, and rain. See Boiling Point; Condenser; Heat.

**Evaporation Value.** Method by which the relative values of different fuels may be expressed. It consists in stating the amount of water which each is capable of converting into steam when burnt under specified conditions. Thus one pound of average coal is capable, theoretically, of converting 15 pounds of water at boiling temperature in the atmosphere into steam; while under the same conditions petroleum would convert 21 pounds, and ordinary dry straw 8½ pounds. These figures represent the evaporation values of the fuels named. See Fuel.

**Eve.** Name of the first woman in the Biblical story of creation. In Hebrew the form of the name is Chawwah. It was given to the woman by Adam (Gen. iii, 20), and is explained as meaning "living" or "life." She was so called, it is stated, because she was the mother of all living. See Adam; Creation.

**Evection** (Lat. *e*, from, out; *vehere*, to carry). Inequality of the moon's motion, which increases or diminishes the mean longitude of the moon to the extent of 1 deg. 20 mins. See Moon.

**Evelina.** Fanny Burney's first novel. The first avowed novel of society, it was published anonymously in 1778 under the title of *Evelina*; or a Young Lady's Entrance into the World. Johnson declared that there were passages in it which might do honour to Richardson.

**Evelyn**, JOHN (1620-1706). English author and diarist. He was born at Wotton House, Surrey,



After Holb.

Oct. 31, 1620.

Of a good family, he was educated at Lewes and Balliol College, Oxford, and became a student of the Middle Temple. Possessing ample means, he remained abroad during the greater part of the Civil War. A sincere royalist and churchman, his admiration for Charles II in exile did not blind him to his faults later, when, after the restoration, he enjoyed favour at Court. From 1653-94 Evelyn was settled at

Sayes Court, Deptford, where he transformed a rude orchard and field of 100 acres into a pleasure of notable charm. He befriended Jeremy Taylor and other divines, was on terms of intimacy with many notable men of his time, including Bentley, Boyle, John Wilkins, Pepys, Grinling Gibbons, and Hollar. He helped to found the Royal Society, and was its secretary in 1672. He was a commissioner for the rebuilding of St. Paul's Cathedral; aided church establishment in the plantations; was a commissioner of the privy seal, 1685-87; and treasurer of Greenwich Hospital, 1695-1703.

In addition to gardening and forestry, he took an active interest in agriculture, architecture, art, engraving, music, and navigation. His *Sylva*, 1664, first drew attention to the importance of forestry in England; *Terra*, 1676, was a first attempt in English at a scientific study of agriculture; *Sculptura*, 1662, a work on engraving, was suggested by Boyle. He wrote a *Character of England*, 1659, an admirable *Life of Mrs. Godolphin*, a discourse on Medals, and a *History of the Dutch War*, which is lost.

He is remembered for his *Diary*, 1620-1706 (more properly described as his memoirs), a work valuable for its reflection of the political, social, and religious life of his time. The MS. of this was in danger of destruction when, at the suggestion of William Upcott, it was edited by William Bray, and first published in 1818. After 1694 he lived at Wotton, where he died, Feb. 27, 1706, and was buried in the chapel. He is well described as a patriot who kept his loyalty in dangerous times, a Christian who preserved his integrity in the most immoral, and a philosopher who viewed every object with a desire to extract from it all the beauty and goodness it contained. See editions of the *Diary*, with *Life* by H. B. Wheatley, 1906; and by Austin Dobson, with introduction and notes, 1908; *The Early Life and Education of John Evelyn*, 1620-41, H. Maynard Smith, 1920.

**Evening News**, THE. London evening newspaper. Started in 1881 in the Conservative interest as a rival to *The Echo*, in 1889 it absorbed *The Evening Post*, founded 1887. In Aug., 1894, it was acquired for £25,000 by a new company of which Alfred Harmsworth (Viscount Northcliffe), Harold Harmsworth (Viscount Rothermere), and Kennedy Jones were the proprietors. Under the new direction it emerged from an almost moribund concern into a property

yielding in the first year a profit of £14,000 and in the second £25,000. Its ever-increasing success—it had in 1920 a net sale of 825,825—led to the foundation of The Daily Mail. From 1894 until 1896 Kennedy Jones was editor; he was succeeded by W. J. Evans. Prominent regular contributors have included Claude Burton (C. E. B.), Oswald Barron (The Londoner), P. H. Fearon (Poy), and Arthur Machen. With The Daily Mail and The Weekly Dispatch it is issued by The Associated Newspapers, Limited, from Carmelite House. See Daily Mail; Northcliffe, Viscount.

**Evening Primrose** (*Oenothera biennis*). Biennial herb of the natural order Onagraceae. It is a native of N. America. The leaves are oblong-lance-shaped; the flowering stem (2nd year), 4 ft. or 5 ft. high, branched with narrower, toothed leaves, terminates in a long spike of large, pale yellow flowers, opening in the evening. The variety *lamarckiana* has much larger flowers than the type form, and has been much studied. See Mutation.

**Evening Schools.** Term specifically given to evening classes established in the United Kingdom, mainly during the first half of the 19th century, for giving elementary instruction to illiterate adults. One of the earliest was started at Bala, N. Wales, in 1811. The system was warmly supported by Bishop Hinds in 1839, and was adopted by the Ragged School Union, founded 1844, and known since 1898 as the Shaftesbury Society. The term is still officially used to cover schools in which pupils beyond the compulsory school age may continue their education. See Continuation School; Education.

**Evening Standard, THE.** London evening newspaper, started June 11, 1860, as a pendant to its morning namesake, itself originally an evening paper first published May 21, 1827. Acquired from the Johnstone family in 1905 by C. Arthur Pearson, who had in 1903 purchased the St. James's Gazette (founded in 1880), The Evening Standard was merged with the latter. In 1910 Davison Dalziel secured the controlling influence; in 1915-23 it was owned by Hulton & Co., and from 1924 by Lord Beaverbrook.

**Everest.** Loftiest peak of the Himalayas. Its height is 29,002 ft. (5½ m.), the highest on the globe. It stands on the border between Nepal and Tibet, and its snow-covered peak is difficult of access, and has never been ascended or thoroughly explored. It was named after Sir George Everest (1790-1866), surveyor-general of India, and has often been confused with the neighbouring peak, Gaurisaukar. British expeditions, in 1921, 1922, and 1924 attempted to scale it, but without success.

**Everett.** City of Massachusetts, U.S.A., in Middlesex co. It stands on the Mystic river, 4 m. N.E. of Boston, and is served by the Boston and Maine Rly. Its industrial activities include ironfounding and the manufacture of steel, boots and shoes, radiators, and leather goods. Settled in 1643, it became a city in 1892. Pop. 40,150.

**Everett.** City of Washington, U.S.A., the co. seat of Snohomish co. A port of entry on Puget Sound, it is 34 m. N. of Seattle, and is served by the Chicago, Milwaukee and St. Paul, and other rlys. Situated in a mineral and lumbering region, it has an excellent harbour, and trades largely in the products of the locality. Settled in 1891, it was incorporated in 1893. Pop. 32,050.

**Everett, EDWARD** (1794-1865). American statesman and writer. Born at Dorchester, Massachusetts, April 11, 1794, he was for two years a Unitarian minister. Leaving the ministry, he became professor of Greek at Harvard College, 1819-25, and president, 1846-49. He edited the North American Review, 1820-24, was member of Congress, 1824-

35, minister to Great Britain 1841-45, and senator 1853-54, when he abandoned public life. In politics

Everett was a republican, and when the Civil War broke out he strongly supported the cause of the Union, although to the last he had hoped that war might be averted. He died at Boston, Jan. 15, 1865. His literary output consists mainly of articles in The North American Review, and A Defence of Christianity, 1814. His reputation, however, chiefly rests upon his speeches, highly elaborate and most carefully prepared. See Orations and Speeches, 1850-59; Life and Services of Edward Everett, R. H. Dana, 1865.

**Everglades.** Swampy wilderness in S. Florida, U.S.A. The region is low-lying and its heavy rainfall and high temperature encourage the rank growth of vegetation, thus increasing the natural difficulty of drainage. Situated in the S. part of the state, it extends N. to S. for about 120 m. and is about 45 m. broad. During the rainy season it has a depth of 1 ft. to 10 ft. It contains a number of islands bearing cypresses, pines, palms, and vines, but is mainly a huge, almost impenetrable, tract covered with saw-grass which reaches a height of 6 ft. Attempts at reclamation by cutting canals have met with some success, and sugar-cane has been cultivated in the drained portions. See Florida.



Edward Everett, American statesman



Evening Primrose, a biennial herb



Everest. The highest peak in the world viewed from Mt. Phalut, Darjeeling. Five miles high, its summit is almost inaccessible



**Evergreens.** Plants whose leaves last several years and are not shed simultaneously. The plants are thus never leafless. The holly, for example, produces new leaves each season, but each of these lives for three or four years; therefore, although there is a leaf-fall every year, it only affects the oldest leaves and the foliage as a whole is always full and green. Evergreen leaves are of leathery consistence with glossy surface, and are thus protected against rapid loss of moisture in summer and the effects of frost in winter.

**Everlastings** OR IMMORTELLES. Term applied to the flower-heads of certain composite plants. Their bracts are of a hard, parchment-



Everlastings. Flowers of *Helichrysum bracteatum*, which, when dried, retain their colour and form for years

like character and coloured, so that if gathered in their prime, i.e. just before they are fully expanded, they will retain their form and colour for several years. The most striking of these are species of *Helichrysum*, *Acroclinium*, *Rhodanthe*, *Aphelexis*, *Waitzia*, and *Xeranthemum*. When gathered they are hung heads downwards to ensure perfect drying.

**Eversley.** Village and parish of Hampshire, England. It is 14 m. N.E. of Basingstoke, and almost on the borders of Surrey. The church of S. Mary, which dates from the early part of the 18th century, had Charles Kingsley for its rector from 1844-75. He is buried in the churchyard and the place is chiefly known for its association with him. Near is Bramshill House, a fine building erected for Prince Henry, son of James I. Pop. 841.

**Eversley, CHARLES SHAW-LEFEVRE, 1ST VISCOUNT (1794-1888).** British politician. Born Feb. 22,

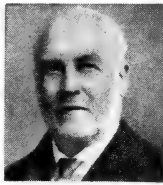


1st Viscount Eversley. British politician

1794, he was educated at Winchester and Trinity College, Cambridge. He entered Parliament as a Whig in 1830 and sat for N. Hants from 1832-57. After

serving as chairman of various committees, he was elected speaker in 1839, and filled that office with distinction, reforming procedure and maintaining order in the difficult times of O'Connell and the free trade debates. In 1857 he retired and was created Viscount Eversley. He died at Heckfield, Hampshire, Dec. 28, 1888. The title became extinct, but was revived as a barony in 1906 in favour of his nephew, Rt. Hon. G. J. Shaw-Lefevre.

**Eversley, GEORGE JOHN SHAW-LEFEVRE, BARON (b. 1832).** British politician. Born June 12, 1832, he was educated at Eton and Trinity College, Cambridge. As a Liberal he was M.P. for Reading, 1863-85, and for Bradford, 1885-95. He was civil lord of the admiralty in



1st Baron Eversley, British politician  
Russell

1856, secretary to the board of trade, 1869-71; secretary to the admiralty, 1871-74; first commissioner of works, 1881-83 and 1892-93; postmaster-general, 1883-84; and president of the local government board, 1894-95. He was raised to the peerage in 1906. In 1919 he published his *Reminiscences*.

**Evert, ALEXIS ERMOLAEVITCH (b. 1857).** Russian soldier. Born Feb. 20, 1857, he entered the army in 1874, saw active service in the Russo-Turkish War, 1877-78, and took part in the Russo-Japanese War, 1904-5. After the outbreak of the Great War he commanded one of the Russian armies in S.E.

Poland, which defeated the Austrians under Dankl in Aug.-Sept., 1914. In 1915-16 he was commander-in-chief of the Russian central armies, and skilfully conducted the retreat from the Niemen. He resigned his command in March, 1917.



Alexis Evert, Russian soldier

**Everton.** Parish of Lancashire, England, forming a N.E. suburb of Liverpool, and within its borough limits. Here is S. Edward's Roman Catholic College, founded 1842 and enlarged in 1875. It stands in its own grounds of 11 acres. Everton is celebrated for its toffee. Pop. 120,865. See Liverpool.

**Everton.** Association Football Club. Founded in 1879, it originated from a church school, the first ground being in Stanley Park, Liverpool. In 1885 it adopted professionalism, and in 1888 was one of the twelve clubs that formed the Football League on its foundation. The club has played in the premier division ever since. In the first year of the competition it occupied eighth place in the league table, and in 1890-91 secured the championship, scoring 29 points out of a possible 44. In 1914-15 it again won chief honours, its record being 46 points out of a possible 76. On six occasions the club has been runner-up. Everton won the Football Association Cup in 1905-6, beating Newcastle United by one goal to nil in the final. Their ground is Goodison Park, Liverpool. See Football.



Everton. Association Football Club Team, 1920-21. Left to right, standing: J. Elliott (trainer), T. Fleetwood, J. McDonald, A. Grenyer, T. Fern, G. Brewster, R. Downs; sitting, S. Chedzoy, W. Kirsoff, J. Peacock, D. Reid, G. Harrison, — Clarkson

Tuson, Manchester

**Everyman.** English morality play of the late 15th century, probably translated from its Dutch counterpart, *Elckerlijck* (printed c. 1495). The earliest known editions of *Everyman* were printed by Richard Pynson (undated, but apparently before 1531). The play, which "comprises the whole pitiful pathos of human life and death," is one of the finest examples of the moralities. The story of God's summoning of *Everyman* (all mankind represented as an individual) by Death on that journey which none may escape, and of *Everyman's* attempts to find a willing companion, is based on an earlier parable told in the religious romance of Barlaam and Josaphat (*q.v.*).

**Bibliography.** Select Collection of Old Plays, R. Dodsley, ed. W. C. Hazlitt, vol. 1, 1874; *Everyman*, introd. by F. Sidgwick, 1902; *The Summoning of Everyman*, ed. J. S. Farmer, 1906.

**Everyman Theatre.** Theatre at Hampstead, London, N.W. A drill-hall close to the Tube station at Hampstead was acquired and fitted up as a small theatre with a seating capacity of about 300. This was opened as a repertory theatre on Sept. 15, 1920, with *Bonds of Interest*, a Spanish comedy by Jacinto Benevente, and other high-class plays followed in quick succession. Norman MacDermott was the first manager.

**Evesham.** Mun. bor. and market town of Worcestershire, England. It stands on the Avon, 15 m.



Evesham arms

E.S.E. of Worcester, on the G.W. and Mid. Rlys. S. Egwin founded a Benedictine monastery here in the 8th century, of which a bell tower and gateway still remain. The town hall is an Elizabethan structure, and the grammar school was founded by Abbot Lichfield in 1536. The battle of Evesham was fought at Green Hill. The site is marked by an obelisk. Fruit growing and market gardening are actively engaged in. There is excellent boating on the Avon. Market day, Mon. The town lends its name to a co. div. returning one member to Parliament. Pop. 8,340.

**Evesham, BATTLE OF.** Fought Aug. 4, 1265, between the royalists under Edward, afterwards Edward I, and the baronial party under Simon de Montfort. Defections had broken Montfort's power, and in the summer of 1265 he was retreating before his foes. The force which his son Simon was bringing

from the S. to join him was destroyed by Edward at Kenilworth, Aug. 1, and the elder Simon, falling back into Wales, halted at Evesham, Aug. 3. Prince Edward hastened up and cut off all chances of escape. His plans were so cleverly laid that Earl Simon exclaimed: "God have mercy on our souls, for our bodies are theirs." The royalists attacked in two divisions, and the battle was soon over. Numbers told, both Simon's horse and foot gave way, the former only after a stubborn resistance, and Montfort and his son Henry were killed.

**Eviction** (Lat. *evincere*, to overcome). Name given to the process of ejecting a tenant from a house or land. In the United Kingdom, as the law stood before 1914, an eviction order could be obtained from a magistrate by the landlord, provided he had given due notice to the tenant. The legislation occasioned by the Great War made evictions more difficult, and by the Courts (Emergency Powers) and other Acts, tenants could only be evicted if the landlord required the premises for his own use. The word is chiefly known in connexion with the evictions of Irish tenants for refusing to pay their rent, which was a marked feature of the land trouble between 1880 and 1900. In 1907 an Act for the benefit of the evicted tenants was passed; it gives powers to commissioners to secure land for them. See Distraint; Ireland; History; Rent Restriction.



Evesham. Bell tower of the old Benedictine monastery

From a sketch by C. G. Harper

**Evidence** (Lat. *evidentia*). Word used for the legal method of proving facts in a court of law. The law of evidence is one of the chief points of difference in the administration of justice between English-speaking countries and others. English courts are very strict in their admission of evidence, or rather in their exclusion of certain matters of evidence and modes of proof. The chief rules of evidence are: (1) That all evidence must be relevant to the issue; (2) that

such relevant matters must be proved by the "best" evidence.

Relevancy is really a matter of logic. How far any given fact offered to be proved tends to prove any matter in issue is for the judge to decide. One or two things may be borne in mind. A witness's opinion (*e.g.* "I think the driver of the car was to blame") is no evidence. It is never relevant, except where technical matters are in dispute, and then the opinion of skilled experts is admitted because there is no other way of arriving at the facts. The character of the parties is not relevant; and, therefore, if I sue a man for damages for fraud I am not allowed to call 50 witnesses to show that he is a man who has committed other frauds. All I am allowed to do is to cross-examine him as to his character, and try to drive him to admit that his record is bad. But even this is not evidence that he defrauded me.

The only time a plaintiff, or prosecutor, can call evidence of the kind above described is where the evidence shows a system of wrongdoing, and the act in issue is a part of the system—long firm frauds for example. On the other hand, a man accused of crime may always bring evidence of his good character. A plaintiff's character can be attacked to reduce the damages in an action for slander or libel; because, obviously, a man of bad character does not suffer so much from an attack on his reputation as a man of good character does.

The rule of best evidence is a rule of exclusion. It excludes hearsay. If you wish to prove something seen or heard, you must put in the box the man who saw or heard it, and not a man who heard that another man saw or heard it. This is English law. The contents of a document must be proved by producing the document itself. If the document is, or has been, in the possession of the other side, who does not produce it after notice to do so, secondary evidence may be given. Again, if the judge is satisfied that it has been lost, stolen, or destroyed, secondary evidence is admissible. Bankers are allowed, instead of producing their books in court, to send a certified copy. And there are whole classes of public documents, such as entries in marriage, birth and death registers, wills, or bills of sale, which can be proved by officially certified copies.

A statement made by one of the parties (admission or confession) is always evidence against him, but not in his favour. Thus, a tradesman cannot put in his books to

prove his claim; but the other side can call for them and put them in to disprove it.

There are a few exceptions to the rule against hearsay, i.e. in pedigree cases, the statements made by a deceased member of the family before the litigation was mooted. For example, the question being whether Harry Smith is the son of John Smith of Chichester, a member of the family can say, "My mother was John Smith's sister. She is now dead. I often heard her say that her brother John married, and had a son he called Harry after my grandfather." On this principle, entries in family Bibles, and even inscriptions on tombstones can be called into play. Another class of hearsay admissible is "declaration against interest" by a deceased person. Thus, a deceased solicitor's bill, receipted, but not otherwise, is admissible in evidence to prove the facts set out in it. Yet another class of hearsay admissible is any entry made by a person, since deceased, which it was his duty to make when he made it.

At one time, the English common law did not allow any person who was interested in an action to give evidence, whether his interest arose from blood or was pecuniary. This restriction has now been done away with. The only remnant of it remaining is that in a criminal case, except in a case of bigamy, a husband or wife cannot give evidence for the prosecution, unless it is on a charge brought by one spouse against the other. *See Jurisprudence; Law.*

**Evidences of Christianity, A VIEW OF THE.** Theological work by William Paley first published in 1794, containing (1) the direct historical evidences of Christianity; (2) the auxiliary evidences; and (3) a consideration of some popular objections. Largely based on Butler's Analogy of Religion and Nathaniel Lardner's Credibility of the Gospel History, the work, in its time hailed as a crushing reply to scepticism, has come to be regarded as inadequate.

**Evil.** In the theological and ethical sense the absence of good, or unsatisfied desire. But neither definition is satisfactory. To say that evil is the absence or the opposite of good at once raises the question, "What is good?"; and the answer must depend largely upon the standpoint of the individual. To define evil as unsatisfied desire pre-supposes that the desire itself is not evil. If it is, its frustration is good rather than evil. To find the supreme good in

the satisfaction of desire, and evil in its frustration, ignores the possibility of a higher and external moral imperative taking precedence over mere personal desire.

From the theological point of view, the definition of evil is comparatively simple. It is that which does not conform to the Will of God. But the Will of God is manifested by both direct command and by permission. Evil, like all other things, can only exist by divine permission; and in this sense its existence is not contrary to the Will of God. But the thing in itself and the fact of its existence are not the same thing. The Will of God may permit the existence of an evil which is itself directly opposed to that Will; and such permission in no sense makes God the author or the cause of evil.

#### The Problem of Relativity

Why evil is permitted to exist has always been a perplexing problem; and it is not greatly helped by the counter question, "Does evil exist?" If evil is a mere negation or absence of good, it has no real existence, and is nothing at all. What really happens is that the good exists in a less degree than is to be desired. The existence of so-called evil, therefore, resolves itself into this—that the universe is not perfect. Viewing evil as merely imperfection, the problem of its existence becomes less difficult. It is no reflection on the goodness of God that He is pleased to let the world progress through imperfection to perfection. Such a process of progression and growth is analogous to what is seen in the world of animal and vegetable life.

Another element in the problem of evil is that of relativity. In certain circumstances and in some relations a thing may be evil which is not necessarily evil in itself. But we are not in a position to judge the circumstances or to weigh the relations; for the simple reason that only a portion of the world of reality lies within our ken. We only see part of the machine; and those parts which appear inappropriate or superfluous may be essential or beneficial to the part of which we know nothing. *See Ethics.*

**Evil Eye.** Faculty of causing material harm by means of a glance. In Shakespeare, and in modern rural England, it is called overlooking. From its ancient Roman name *fascinum* comes the word fascination. Distinguishable from the subjective influence of the eyes of snakes, it denotes a form of witchcraft, owing its origin to the presumption that the eye is capable of operating at a distance.

It may be exerted, voluntarily or involuntarily, upon human beings and domestic animals, especially when young, besides crops, dwellings and other objects. Envy (Lat. *invidia*, on-looking) is a potent incentive of evil eye.

The belief is traceable to the beginnings of recorded history, and its widespread survival in primitive culture attests its primeval origin. Various curative and preventive measures are employed. Prevention is sought by spitting, muttering counter-charms, making offensive figures or gestures, giving to children opprobrious names, wearing knotted cords, or displaying amulets, many of which are specific for evil eye. They include representations of eyes—such as the ancient Egyptian *usa*—hands, horns, teeth, shells, nuts, lunar crescents—such as the camel-ornaments of Judges 8—red and blue objects, and magical or sacred texts. Evil eye is referred to by its technical name in the N.T. in Gal. 3, where it is translated "bewitched." The Greek belief is enshrined in the mythical gorgon Medusa, whose glance turned its victims to stone; the use of the gorgon's head as a preventive amulet persists in modern doorknockers. *See Divination; Magic; consult also Evil Eye, F. T. Elworthy, 1895.*

**Evil-Merodach** (d. 560 B.C.). King of Babylon. The name is the Biblical spelling of the cuneiform Amel-Marduk, servant of Marduk. He succeeded his father, Nebuchadrezzar II, and after a career of tyranny and unrestraint was, within two years, violently slain by his brother-in-law, the Nergal-sharezer of Jer. 39, who seized the throne. In II Kings 25 he is said to have shown special clemency to Jehoiachin, king of Judah, after 37 years of rigorous imprisonment.

**Evolute** (Lat. *e*, from, out; *volvere*, to roll). In geometry a curve which is the path of all points that are the centres of curvature of a second curve called the involute. To measure the curvature of any involute we find a circle which coincides with the curve for a short distance. If the curvature to be measured is great this circle of curvature can only have a small radius because it will accompany the first curve only a small way. If the curvature is small the radius of the circle will be correspondingly larger. The centre of this circle at any point on the curve is the centre of curvature at that point. It is clear that there will be a number of these circles for any curve. When their centres are all joined up they form the evolute. *See Circle; Geometry.*

## EVOLUTION: THE DEVELOPMENT OF LIFE

J. Arthur Thomson, LL.D., Regius Prof. of Natural History, Aberdeen

*This important article can well be supplemented by those on Biology; Life; Sex. See also Cell; Heredity; and other articles bearing on the subject; also Darwin; Gallon; biographies of other biologists*

Evolution (Lat. *evolvere*, to unroll) is a process wherein one kind of living creature gives rise to another kind, which persists alongside of or in place of the original stock. Thus we believe that birds evolved from an ancient reptilian stock, and mankind from a primitive simian lineage, the origins in both cases being extinct. In the case of domestic pigeons derived from the wild rock-dove (*Columba livia*), or of poultry derived from the jungle-fowl (*Gallus bankiva*), the origins are still extant. Similarly, wild ancestors of such cultivated plants as cabbages and apple-trees still exist. The evolutionary process is going on among wild plants and animals, e.g. in some evening primroses, or in many birds and butterflies, but it is not readily detected in a lifetime or in the relatively short time since precise biological registration began.

### What Evolution Means

While evolution is strictly a slow racial change in living creatures, the term is often used much more widely. Evolution should not be confused with development, which is best restricted to a continuous change in one and the same unity, such as a germ, a seed, an organ, an institution, or a solar system. Development agrees with evolution in being a series of changes in a definite direction from one position of equilibrium to another, but differs from it in concerning one and the same individual system from beginning to end, whereas evolution is racial, implying a succession of generations and a sifting process. Briefly, development in biology is the individual's coming to be (Ontogeny); evolution, in biology, is the genetic history of a race (Phylogeny). Hence we should speak of the development, not of the evolution, of the earth.

Evolution may be in the direction of increased complexity and control (differentiation and integration), or in the opposite direction. A tapeworm is the result of a process of evolution just as surely as is the golden eagle within which it lives. Yet in spite of many instances of retrogressive evolution in animate nature, the general trend of the process has been progressive, i.e. towards increased differentiation and integration of fuller and freer life. This fact must never be lost sight of in contemplating the history of things as a whole.

As applied to living creatures, the evolution theory states the broad idea that the present is the child of the past and the parent of the future. The fauna and flora of to-day, both in themselves and in their myriad inter-relations, are the outcome of an antecedent state of affairs in which animals and plants were on the whole rather simpler. This again originated in organisms and relations simpler still, and so on back through hundreds of millions of years, until all clues are lost, and we find ourselves in the mist of life's beginnings. The evolution theory thus states the view that the manifold intricacy of animate nature has arisen by a natural process of slow organic change, similar to that seen in the history of domestic animals and cultivated plants.

One point remains to be emphasised. The statement that living creatures have come to be as they are by evolution, only means that their history has been a natural history, the moves in which have known, or at any rate knowable, causes. To think that any result whatsoever acquires dignity, permanency, worth, invulnerability, or sanctity, because it is the result of evolution, is a misunderstanding, for the value of survival, as judged by human standards, depends on the conditions under which survival is secured.

### Evidences of Organic Evolution

This general evolution theory, or doctrine of descent, cannot be proved like the law of gravitation. It is the only scientific way of answering the question: How has the present-day system of animate nature come into being? But while all the facts of zoology and botany serve as evidences of evolution, four main lines of argument have been followed by Darwin and others.

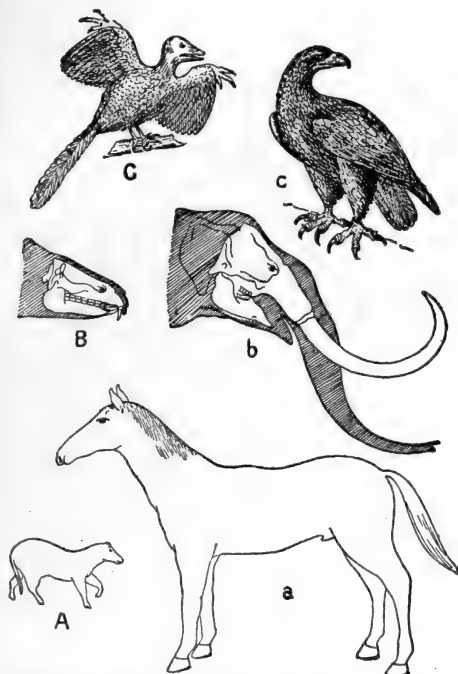
The first is mainly anatomical. Many facts in regard to structure corroborate the evolutionist interpretation, and seem to naturalists to admit of no other. Thus, the fore-limb of a frog, the paddle of a turtle, the wing of a bird, the fore-leg of a horse, the flipper of a whale, the wing of a bat, the arm of a man, exhibit in diverse guise the same essential parts, twisted into manifold forms for different uses, but always of the same fundamental type. There is essential similarity in the important bones, and considerable re-

semblance in the musculature, innervation, and blood-supply. All these fore-limbs are homologous with one another, i.e. they agree in fundamental structure and development. It is difficult to understand this adherence to type except on the theory of the actual flesh-and-blood relationship of backboneed animals. Many vestigial organs in animals, especially the higher animals, remain very slightly developed and are of no use; comparable, as Darwin said, to unpronounced letters in words, the *o* in leopard, or the *b* in doubt. Man has a minute useless third eyelid and a hint of muscles for moving the trumpet of the ear. The only rational interpretation of such structures is the evolutionist one, that they are dwindling relics of structures well developed and of some functional importance in ancestral forms.

### The Physiological Argument

The second line of argument may be called physiological. When the blood of a horse is transfused into an ass, or that of a hare into a rabbit, there is harmonious blending. But when human blood is transfused into a horse or rabbit there is great disturbance, marked, for instance, by destruction of red blood corpuscles. The harmonious mingling is evidence of near blood-relationship, the destructive reaction proves the reverse. By modification of this experiment it is possible to gauge the degree of relationship between man and the various groups of apes and monkeys. Along with this physiological argument may be taken the abundant evidence of the variability of living creatures. In a short time man has established over 200 breeds of domestic pigeons, which seem all to have been derived from the blue rock-dove.

Another line of argument is historical or palaeontological. From the rock record we have accumulated a great mass of material in regard to the successive appearance of horse-types, elephant-types, crocodile-types, and so forth, all reading like a lineage or pedigree. Moreover, there are many connecting links now extinct, such as *Archaeopteryx* (see Birds), which, though an indubitable bird, had several well-marked reptilian features, e.g. teeth in both jaws, a lizard-like tail, and claws on the three digits of the hand. Again, there is the big fact that in the rock record amphibians appear after fishes, reptiles after amphibians, birds and mammals after reptiles; as age succeeded age, nobler and nobler forms of life emerged.



Evolution. Early and late stages in evolution. A. Early four-toed ancestor of the horse. Its proportionate size is shown by comparison with a. B. Head and skull of an early ancestor (Meritherium) of the elephant, whose head and skull are shown in b. C. The oldest known bird, *Archaeopteryx*, two specimens of which have been obtained from *Jurassio strata*, compared with, c, golden eagle

By courtesy of Andrew Melrose

The embryological evidence is very striking. The embryos of the higher vertebrates, viz. reptiles, birds, and mammals, develop for a considerable distance along the same road, or along closely parallel roads, before they diverge. For instance, in the neck region of the embryo higher vertebrate, there are gill-clefts or visceral clefts which have no respiratory significance, and can hardly be said to be useful, except that the first becomes the Eustachian tube connecting the ear passage with the back of the mouth. These can only be recapitulations of the respiratory apparatus of remote aquatic, lower vertebrate, ancestors.

#### Great Steps in Organic Evolution

There was a time when the temperature of the earth was far too high to admit of the existence of any forms of life like those we know. Whether germs of living organisms reached the earth from elsewhere, or whether very simple living organisms evolved upon the earth out of non-living matter, is unknown, but it is certain that living organisms did have a beginning upon the earth, and probable that

the first organisms were much simpler in organization than any clearly visible living creatures of to-day. It has been suggested that the earliest living beings were minute, possibly ultra-microscopic particles of the nature of chromatin, a protein material characteristic of all cell-nuclei.

These hypothetical primitive organisms have been called biococci. Some of these may have given rise to the bacterial type of organism, consisting of a minute globule of chromatin surrounded by a firm envelope. As time went on and size increased the chromatin-globules might increase in number and acquire some complexity of arrangement, and a non-chromatinic ground substance (cytoplasm) might accumulate around them and within the envelope.

On another line of evolution a less vegetative and more predatory organism may have arisen by the formation, around a number of biococci or chromatin-grains, of an enveloping matrix of active semi-fluid substance exhibiting streaming or amoeboid movements. This was a prototype of the animal, and it preyed upon other minute creatures. Later on, the chromatin-grains probably concentrated to form a definite cell-nucleus in the midst of the active matrix, and a true cell was formed. These suggestions serve to indicate that probably a long journey had to be travelled before even the first true cells appeared.

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Moreover, the plant cell is almost always surrounded by an envelope or cell-wall of cellulose, and this restriction, taken along with the poorly developed means of getting rid of nitrogenous waste-products, may explain the fixity and sluggishness of plant-life. We are unable here to follow the evolution of the plant world which went on simultaneously with that of the animal world. One of the striking general impressions is that of a succession of dominant groups, each reaching supremacy, and then yielding to another. Thus the gigantic club-mosses and horse-tails which made great forests yielded to Cycad-like forms and passed into relative insignificance; the Cycadophytes in turn yielded to the flowering plants.

#### Multicellular Organisms

It was a red-letter day in organic evolution when "bodies" began to be, i.e. when some living creatures passed from the unicellular to the multicellular grade of organization. Many flagellate infusorians form colonies or families of connected cells, the daughter-units, formed by division of the mother-unit, remaining associated, instead of drifting apart to live isolated lives, and it was probably in some such way that multicellular organisms began. It must be clearly understood that the step was not primarily one of increase in size, for a rotifer or wheel-animalcule built up of a thousand cells is much smaller than a unicellular infusorian such as the *Noctiluca* (q.v.).



Nor was the step primarily one of increasing complexity either of organization or activity, for many ciliated infusorians, though unicellular, are far more complex in plasmic architecture and in ways of life than the fresh-water polyps, built up of thousands of cells. The step was on to a new line of organization, the formation of a many-celled body in which scope was given to division of labour among the component units. The structural side of this is called differentiation. The attainment of a multicellular body opened the way to unlimited specialisation of function, and also to an increase of size, which, other things being equal, counts for something in a rough and callous physical environment. The nemesis of this great step of gaining a body was apparently that organisms became liable to natural death in proportion to the complexity of the bodily framework. For natural death appears to result from the accumulation of wear and tear effects, and the failure of the ceaseless attempts to cope with these.

#### Evolution of Sex

Another big step was the evolution of male and female multicellular individuals within the same species, the two sexes being complementary in the process of reproduction which secures the continuance of the race. The biological significance of the evolution of sex among multicellular animals was threefold. First, sexual reproduction implies that multiplication is effected by the liberation of germ-cells, which is more economical than separating off fragments or buds. There is also an increasing possibility of a large number of offspring. Secondly, to have special germ-cells in some measure apart from the body-cells tends to secure the hereditary persistence of a successful constitution, and lessens the risk of the offspring being prejudiced by disadvantageous dints made on the parent's body.

Thirdly, to have two different kinds of sex-cells, which have to unite at the beginning of each individual life, offers opportunities for new permutations and combinations of qualities, for those new departures technically called variations and mutations. The separation of sperm-producers or males and egg-producers or females, which differ deeply in constitution, would also tend to increase the range of cross-fertilisation which is often advantageous, and would permit of a profitable division of labour between the parents in their relations to the offspring.

Differentiation includes a multitude of evolutionary steps. In the creature called *Volvox*, which consists of a thousand or ten thousand flagellate green cells united in a ball, all the component units, except those concerned with reproduction, are alike. There is no division of labour in the colony. In sponges, however, we see the beginnings of tissues, *i.e.* groups of similar cells performing the same functions. Thus contractile tissue, connective tissue, and flagellate lining tissue (or epithelium) appear among sponges. In the next great series of animals, the Coelentera or Stinging animals, other kinds of tissue, such as nervous and glandular, are differentiated, and we find the first occurrence of organs, such as sensory, digestive, and reproductive organs.

In most sponges and stinging animals the symmetry of the body is radial, *i.e.* there is no right or left side; the animal is the same all round. This is well suited to a sedentary or drifting existence, but for more strenuous life involving the pursuit of prey and mates, and the avoidance of enemies, bilateral symmetry, which virtually began among "worms," is incomparably more effective. It implies a right and a left side, a head end which leads the way, and a tail end.

With the acquisition of bilateral symmetry was associated the establishment of an anterior brain and the development of a head worthy of the name. This opened up another line of advance, technically called integration, in contrast to differentiation. Differentiation means increasing complexity of parts, integration means their more perfect unification and control, and one of the main functions of the nervous system is integrative.

#### Differentiation and Integration

The story of evolution, apart from retrogressive parasites and other degenerates, is one of progressive differentiation and integration, and the evolutionist has to record a long series of achievements. Among these are: an open food canal; a body cavity or coelom between the food canal and the body wall; striped or swiftly contracting muscle; a circulatory system for distributing digested food and oxygen throughout the body and for collecting waste; oxygen-capturing pigments such as haemoglobin; a segmented body as in earthworms; a renewable external armour as in crustaceans; muscular appendages first unjointed and then jointed; specialised sense organs such as eyes and balancers, improved respiratory arrangements reaching extraordinary perfec-

tion among insects; delicate adjustments for filtering out the poisonous nitrogenous waste of the body.

We can only allude to the establishment of the leading types of architecture represented by the various series of invertebrates or backboneless animals. Besides the sponges and coelenterates, we have to deal with the great variety of worm-types; with the higher segmented worms or Annelids; with the starfishes, sea-urchins, and the like forming the Echinoderms; with the jointed-footed Arthropods, such as crustaceans, insects, and spiders; with the unsegmented molluscs without appendages, such as bivalves, snails, and cuttles; and with many smaller groups.

#### Origin of Vertebrates

A step of great magnitude was the origin of the backboneed animals or Vertebrates. It is not unlikely that these emerged from the stock of segmented worms. Their origin meant a fresh start on a new line of more masterful life. A dominant feature was the establishment of a relatively large brain protected by a skull, and of a long, spinal cord protected by the backbone. Of great importance also was the first appearance of bone and of an internal living skeleton (usually of bone) pervading the whole body, and contributing to integration. In the establishment of numerous glands of internal secretion, whose hormones or regulative substances are distributed by the blood throughout the body, a chemical integration began to operate, or to do so on a larger scale.

Skulls began with the hags and lampreys; jaws and paired fins, scales and typical gills with the true fishes; digits, true lungs, vocal chords, and a mobile tongue with Amphibians; the antenatal robes (or foetal membranes) known as amnion and allantois with the reptiles; a four-chambered heart with the crocodilians; warm-bloodedness, or keeping the temperature of the body approximately constant, with birds and mammals, which also show an enormous advance in brain development; the usually prolonged antenatal connexion between mother and offspring with the placental mammals. And just as amphibians mark the transition from water to dry land, so the extinct flying dragons (*Pterodactyls*) pointed towards that mastery of the air which birds and bats have attained.

Along with the great structural advances, there went a functional progressiveness. The smooth working that marks even the simplest creatures is not lost with intricate organization. But the scope of the

life is widened and its agency becomes more free. In a sense, the behaviour of a ciliated infusorian is just as perfect as that of a bird, but the range is narrower, and the resources are fewer. The behaviour of ants and bees is extraordinarily effective on the instinctive line (*see* Instinct), and in its way unsurpassable. It cannot be profitably pitted against the behaviour of a horse or a dog, which is on the intelligent line, but its range resources are narrower. The instinctive creature is apt to be sadly nonplussed by some slight alteration in the routine of its experience. What Sir Ray Lankester has called the "little-brain" type, rich in inborn or instinctive capacities but slow to learn, must be distinguished from the "big-brain" with little ready-made equipment, but with prodigious educability.

The "big-brain" type came to its own in birds and mammals, and there convincing evidence is found of an inner mental life of subjective experimenting, called perceptual inference, or intelligence. Interesting also is the fact that, as an organism attains to complex efficiency and to more or less intelligent mastery of its environment, it is able to practise reproductive economy. There are fewer offspring, but there is less mortality.

#### Emergence of Man

In the Early Eocene age, perhaps three million years ago, there emerged an arboreal race, the Primates, differentiated from other mammals in digits, teeth, skull, and brain. From this stock there diverged in succession the New World monkeys, the small anthropoid Apes (gibbon and siamang), and the large anthropoid Apes (orang, chimpanzee, and gorilla). This left towards the end of the Oligocene (or perhaps in the Miocene) a generalised human stem, from which there diverged in succession *Pithecanthropus* the erect, the slouching man of Neanderthal, and the early Briton of the Sussex Weald—known by the famous Piltdown skull. None of the offshoots came to much, it seems, but the main stem continued as the stock of modern man, broken up in relatively recent times into African, Australian, Mongolian, and European races.

With the emergence of Man evolution passed on to another grade. For there are several reasons for avoiding the false simplicity of regarding social evolution as no more than a continuation of infra-human evolution. The first and chief reason is to be found in man's undeniable apartness and

pre-eminence as a rational and social person. Man is differentiated by his language, by his capacity for forming and experimenting with general ideas, *i.e.* by his reason, by his vivid self-consciousness of his own evolution and by purposeful determination to control it; and by his strong kin-instincts. The second reason is the fact that in social history we have to deal with integrates of social persons, operating as unities of a higher order. The third reason is the importance of what lies outside the individual, namely, in literature and art, the folk-ways of customs and tradition, the external registrations which we call institutions. In all this new notes are struck, and the evolution of man, though continuous with, is more than a mere continuation of, the evolution that goes on in infra-human animate nature.

#### Factors in Organic Evolution

While the general idea of evolution is accepted by most naturalists, there is great uncertainty in regard to the operative factors. The uncertainty is partly due to the difficulty of arguing from a meagre experience of the present to a past of many millions of years, and partly to the fact that the inquiry is still very young, for it virtually dates from Darwin's *Origin of Species*, 1859.

There are two main problems. The first asks how the continual emergence of new things, of changes or variations which make an organism appreciably different from its parents or its kin, is to be accounted for. The second asks what directive factors may operate on the variations which arise, determining their elimination or persistence and working towards the familiar but puzzling result—the existence of distinct and relatively well-adapted species.

Some of the peculiarities or observed differences distinguishing members of the same species can be shown to be individually acquired bodily modifications directly due to some peculiarity of nurture in the widest sense. But as there is no secure evidence that these characteristics are transmitted to the offspring, they can only be of indirect importance to the race. The raw material of evolution is furnished not by these modifications, but by variations which are inborn, not acquired or imposed from without.

Among these variations there may be distinguished minute peculiarities, and larger abrupt sports of notable amount, such as a fantail pigeon or a copper beech. The former, Darwin's "individual variations," may be usefully termed

fluctuations. The sports correspond to Galton's "transient variations," Bateson's "discontinuous variations," De Vries's "mutations," and the last term should be kept for them. The transmissibility of inborn fluctuations has been proved in a few cases, and it was Darwin's conviction that "it is by the accumulation of such extremely slight variations that new species arise."

As to the origin of those minute novelties, a falling out of some feature, or a rearrangement of certain characters displayed by ancestors, it is possible to think of them as due to the intricate permutations and combinations that occur in the germinal material in the history of the germ-cells, especially during maturation and fertilisation (*see* Embryology).

But the baffling problem is the origin of the distinctively new, where the novelty is qualitative, not quantitative, where a new pattern, like a genius, appears. At present science cannot go beyond tentative suggestions. Some facts suggest that environmental influences may act as variational stimuli on the germ-cells and provoke mutation. It is also known that one species may differ from another in the number, shape, size, and structure of its nuclear bodies or chromosomes, and just as bacteria sometimes change suddenly in their physiological properties, so the chromosomes which last on from generation to generation may change in their stereochemical architecture or functional powers.

#### Germ-cells and Variations

This again might be due to environmental influence or to processes of ageing or rejuvenescence occurring in the germ-cells. Just as a remarkable regulatory process, called endomixis, takes place periodically in a "pure line" of slipper-animalcules (*i.e.* in a stock all descended from one individual), so in a lineage of germ-cells, within the organism that bears them, a similar process might occur.

It must be borne in mind that a germ-cell is no ordinary cell, but an organism telescoped down into a one-cell phase of its being. Just as a Protozoan may make experiments as well as a Mammal, so the germ-cells may conceivably make architectural experiments in self-adjustment or self-expression, the outcome being seen in variations.

The most clearly discerned directive factor in organic evolution is natural selection, the process by which, in the struggle for existence, certain variants of a species, marked from their fellows by the presence or absence of some

character, are on that account favoured with longer life or more successful families than their neighbours, who are therefore sooner or later eliminated. The full title of Darwin's great work should be remembered: *The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Existence*. He stated the gist of the theory, which Alfred Russel Wallace had independently reached, in a couple of sentences: "As many more individuals of each species are born than can possibly survive, and as, consequently, there is frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected. From the strong principle of inheritance any selected variety will tend to propagate its new and modified form."

#### Natural Selection

There are several different modes of natural selection; thus it is useful to distinguish between "lethal selection" which works by the discriminate elimination of the relatively less fit, and "reproductive selection," which works through the increased multiplication of the relatively more fit. The operation of natural selection has been satisfactorily demonstrated in a few cases, and it is certainly a potent directive factor. But it is still on trial as regards its scope. Thus, if reason be found for believing that great steps in evolution have been made by sudden mutations, we must reduce our estimate of the importance of natural selection except as a pruning agency. To turn to a less difficult point, it is important to avoid the popular fallacy that natural selection works out the survival of the fittest in any absolute sense; what ensues is the survival of the relatively more fit to the given conditions—which may not imply desirability.

On the other hand, we would re-emphasise the idea that natural selection operates in part in reference to a system of inter-relations which is continually becoming more complex, which is made up of many stable and beautiful and intelligent components that have stood the test of time. Therefore, natural selection does not work capriciously; we get at least a hint of the reason for its working on the whole progressively. Besides selection some have recognized isolation as a directive factor, that is to say all the barriers which restrict the range of intercrossing

within a species. "I do not doubt," Darwin said, "that isolation is of considerable importance in the formation of new species."

**RETROSPECT AND PROSPECT.** When we look back on the majestic process by which the present system of animate nature has come to be, certain general impressions arise in the mind. In the course of the ages there has been, in the animal world, a progressive evolution of the nervous system, an increasing elaboration of behaviour, a gradual increase of free agency, a growing emancipation of mentality. Since the beginning of life there has been on the part of living creatures an increasing appreciation and mastery of their world. To Man, who is part and parcel of the order of Nature, though also singularly apart from it, there is encouragement in the fact that we know of no reason for believing that the evolutionary process will stop. Another general impression of great interest is that while organisms are ever experimenting and tentative, proving all things, they are just as characteristically given to holding fast to that which is good. Species become extinct and races perish, but great organic inventions, such as amoeboid movement or haemoglobin or hormones, are carried on by some collateral lineage. There is a strong power of conservation in the midst of the evolutionary flux.

#### Complexity of the Process

As Lotze said, the process of evolution has the unity of an onward advancing melody. Retrogressions and involutions there have been and are, but the big fact is progress to finer issues. With the growing differentiation and integration (i.e. complexity and control) in organisms, there was correlated some degree of external registration in the system of inter-relations gradually established. For one result of organic evolution has been the weaving of a web of life whose pattern has become more and more intricate, as in the inter-relations between flowers and their insect visitors. This complexifying of relations has probably been of great importance in evolution, for it is in reference to this external system that new organic experiments are tested and that selection works. Thus it seems that the intensification of life has been in part secured and in part prompted by the growing complexity of the external system of Nature.

Thus living creatures contribute to the evolution of their kind, not only directly by exhibiting variations and by personally testing these, but also indirectly by contributing to the complexifying of the

external web of life. If this be so, there is for Man the hint that progressive evolution depends not merely on the improvement of the natural inheritance and intensification of the individual life, but also on the ennoblement of the external heritage—so much Man's own creation—the treasures of literature and art, the tradition of high ideals, and the multitudinous linkages—many in need of amelioration—in the framework of society itself.

#### The Philosophic Conclusion

When we try to think of facts in their entirety, that is to say philosophically, we are probably wise if we hold firmly by the Aristotelian conviction that there can be nothing in the end which was not also present in kind in the beginning. So, if Man is altogether an outcome of the evolutionary process, as most naturalists believe; and if experience of reality to the best of mankind includes a spiritual life, i.e. persistent activity towards the ideals of the true, the beautiful, and the good; then we may be sure that the primordium from which this was evolved could not be adequately or exhaustively formulated in terms of matter and motion. For by no jugglery is it possible to evolve mind out of matter and motion.

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**Evora.** District of Portugal, in the prov. of Alemtejo. It is bounded on the N. by the dist. of Portalegre and on the S. by the dist. of Beja. The river Guadiana forms its E. boundary. Hilly on the N.W. and S. it slopes E. and S., forming the basin of the Degebe and smaller streams flowing into the Guadiana. A large portion of the district is barren, but there are cork-oak forests. Evora is the capital, and Redondo and Montemor are other important towns. Pop. 144,307



Evreux. The city and cathedral seen from the south. To the left is the 15th century Tour d'Horloge or Belfry.

**Evora** (anc. *Ebora*). City and archiepiscopal see of Portugal, capital of Evora dist. Beautifully situated on a low hill in a fertile plain, 72 m. by rly. E. of Lisbon, it is enclosed by ancient walls and towers, has many Roman and Moorish remains, and is as interesting as it is ancient. It has a cathedral, founded in 1186, a 16th century church, an art gallery, a museum, many old convents, a library, a Roman temple, various palaces, and a famous aqueduct. It manufactures cloth, cotton and woollen goods, and hats, and trades in wine. In the vicinity are copper and iron mines, and marble and asbestos quarries. An important fair is held annually. A stronghold of Sertorius (*q.v.*) and a Roman colony, Evora was a bishop's see under the Visigoths, taken by the Moors in 715, and recaptured by the Christians in 1166. Pop. 17,901.

**Evreux**. City of Normandy, France. It is 67 m. W.N.W. of Paris, and stands on the Iton, a branch of the Eure, in the dept. of Eure, of which it is the capital. The chief building is the cathedral of Notre Dame, the earliest part dating from the 11th century and some part from the 16th. It was completely restored at the end of the 19th. Other old buildings are the church of S. Taurin, a Romanesque building of the 11th century, to which an abbey was at one time attached, the episcopal palace, and the belfry. The hôtel de ville, museum, public library, and botanical gardens are notable. There are some small manufactures and a considerable agricultural trade.

Evreux was frequently besieged and taken in the wars between England and France. At Viell Evreux, 4 m. distant, extensive remains of a Roman theatre, baths, aqueduct, etc., have been unearthed. In the Middle Ages the counts of Evreux were powerful nobles; the dignity was given in 1427 to Sir John Stuart of Danley, a Scot in the French service. The English family of Devereux takes its name from here. Pop. 18,950.

**Evzones** or **EUZONES**. Greek troops. They bear a variant of the name given to troops in the times of ancient Greece, *Euzonoi*, meaning well-girdled, and so girt-up for fighting. They are light troops consisting normally of about six battalions, and from their dress are known as the Greek Highlanders. Their uniform consists of a white kilt or *fustanella*, wide-sleeved white shirt, embroidered vest, red-pointed shoes, and blue-tasselled red cap. The Evzones fought in Macedonia and Serbia in the Great War.

**Ewald, CARL** (1856–1908). Danish novelist. Born in Slesvig, when a child he removed with his family to Copenhagen after the annexation of the duchy by Germany. He started in active work as a forester, but turned to miscellaneous literary work, and then to the novel, in which he chiefly won distinction. In *The Old Room* he depicted a rebel against orthodox life, and in *Cordt's Son* his opposite in a strict observer of the conventions. Several of his stories have been translated into English by Teixeira de Mattos, notably *Two-Legs and Other Stories*, 1907; *My Little Boy*, 1908; and *The Pond and Other Stories*, 1909. *Pron.* Ayvahlid.

**Ewald, GEORG HEINRICH AUGUST VON** (1803–75). German Biblical critic and Orientalist. He was born at Göttingen, Nov. 16, 1803, where in 1827 he became professor of Oriental languages and philosophy. In 1838 he was appointed to the chair of theology at Tübingen, and in 1848 returned to Göttingen,

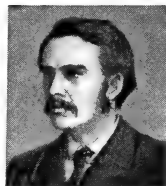
where in 1867 his retirement came about through political complications. His numerous works include a Hebrew Grammar, 1827, and various works on the O.T., but the most important was his *Geschichte des Volkes Israel*, 1843–59. His criticism was cautious, and he exposed the extreme views of the Tübingen school. He died May 4, 1875. *See* Heinrich Ewald; a centenary appreciation, T. W. Davies, 1903. *Pron.* Ayvalt.

**Ewald** or **EVALD, JOHANNES** (1743–81). A Danish poet. Born at Copenhagen, Nov. 18, 1743, a yearning for change and adventure induced him, while still a student of sixteen at Copenhagen University, to join the army of Frederick the Great, then engaged in the Seven Years' War. In 1760 he returned to Denmark and resumed his studies. A cantata written in 1766 on the death of Frederick V of Denmark placed him in the front rank of lyric poets; but his drama, *Valder's Death* (1773), in which he introduced the old gods of Scandinavian mythology, first ensured his fame and gave an immense stimulus to the national pride in the legendary past of Denmark. George Borrow's English translation of this was published in 1889. Other well-known works are *Adam and Eve*, 1769 (rewritten from his rejected *Adamiade*, 1764), and *The Fishermen*, 1778. He died March 17, 1781. *Collected Works*, ed. H. Brix and V. Kuhr, 1914, etc.

**Ewart, JAMES COSSAR** (b. 1851). Scottish naturalist. Born at Penicuik, Nov. 26, 1851, he was edu-



Carl Ewald, Danish novelist



J. Cossar Ewart, Scottish naturalist  
From an etching

develop the Scottish fisheries, and is an authority on marine zoology.

**Ewart, SIR JOHN SPENCER** (b. 1861). British soldier. Born March 22, 1861, he was educated at Marlborough and Sandhurst, joining the Cameron Highlanders, 1881. He saw service in Egypt, 1882, 1884–85, in the Sudan, 1885–86, 1898, and in S. Africa, 1899–1901.



Heinrich Ewald, German scholar



Sir John Ewart, British soldier

He was director of military operations at the War Office, 1906-10, adjutant-general and a member of the Army Council from 1910-14, when he was appointed G.O.C. Scottish Command, May, 1914, which post he held until May, 1918. He was created K.C.B. and lieutenant-general in 1911.

**Ewbank, THOMAS** (1792-1870). British author. Born at Barnard Castle, March 11, 1792, at the age of 13 he was apprenticed to a plumber, and in 1812 obtained employment in London as a labourer. He emigrated to America about 1819, and started a metal tube manufactory in New York, from which business he retired in 1836. After travelling in Brazil, 1845-46, he published his *Life in Brazil*, 1856. Ewbank was commissioner of patents from 1849-52. The remainder of his life was spent in writing on engineering subjects and contributing to scientific journals. He died in New York, Sept. 16, 1870.

**Ewe** (Lat. *ovis*, a sheep). Word used for the female of the sheep (*q.v.*) and of certain other animals.

**Ewé.** W. African language-group. Mostly found in Dahomé, S. Togoland, and the Gold Coast Colony, it forms part of a primitive W. Sudanic speech once widespread in the Guinea region before the advent of Bantu influences. Of the Ewé-speaking peoples the chief French tribes are the Dahomé and Mahi; the British tribes include the Awuna, Agbosomi, and Krikor, E. of the Volta river. The racial type tends to be shorter, fairer, and rounder-headed than that of the true negro.

**Ewell, RICHARD STODDARD** (1817-72). American soldier. Born at Georgetown and educated at the military academy of West Point, on the outbreak of the Civil War he resigned his commission in 1861 to fight for the Confederacy, and took part in both battles of Bull Run, Antietam, Chancellorsville, Gettysburg, and others. In the closing days of the war, in 1865, Ewell and his force were captured by Sheridan at Sailor's Creek. He died at Springfield, Tennessee, Jan. 25, 1872.

**Ewer.** Pitcher or jug with a wide mouth. It is particularly one for holding water for toilet purposes. The word is a corruption of Lat. *aquarium*, watering place: cf. Fr. *eau*. See illus. p. 2443.

**Ewing, SIR JAMES ALFRED** (b. 1855). British physicist and engineer. Born at Dundee, March 27, 1855, he was educated at the high school and at Edinburgh University. Until 1878 he assisted Lord Kelvin, and from 1878-83 was professor of mechanical engineer-

ing at the imperial university of Tokyo, Japan, where he studied earthquakes. From 1883-90 Ewing was professor of engineering at University College, Dundee, and of mechanics and applied mechanics in Cambridge University, 1890-1903. He sat on the explosives committee, and became a member of the ordnance research board in 1906. In 1903 he was appointed director of naval education, and in 1916 became principal and vice-chancellor of Edinburgh University. Among his important inventions were: magnetic curve-tracer, hysteresis tester, and a permeability bridge, all used in testing the iron employed in making dynamos and transformers. He has written much on engineering and scientific subjects, and a *Treatise on Earthquake Measurements*, 1883. He was knighted in 1911.

**Ewing, JULIANA HORATIA** (1841-85). Writer of stories for children. She was the daughter of Alfred Gatty, vicar of Ecclesfield, Yorkshire, and the wife of Major Alexander Ewing. Among the pleasantest of her tales are *The Land of Lost Toys*, 1869; *A Flat Iron* for a Far-



Juliana H. Ewing.  
British author



Ewer. Silver repoussé ewer in the style of early German goldsmiths

thing, 1873; *Jackanapes*, 1884; and *The Story of a Short Life*, 1885. She died May 13, 1885.

**Examinations.** The *raison d'être* of examinations is the desire to find some ready test of capacity. The system, so far as is known, started in China about 2200 B.C. The medieval universities sought to test intellectual capacity by dialectical discussions called disputations. The result was to reward mere "quickness in logical fence."

The change from disputations to questions, the germ of the modern examination system, dates from the 18th century, when the Cambridge tripos list and senior wranglership began to acquire fame. Originally intended "to guide men so that they might learn what was thought best for them," the mathematical tripos soon degenerated into a test for allocating the college fellowships. The incorporation of the university of London in 1836 was important as first differentiating the teaching and examining functions of a university, and in 1848 Dr. Whewell, at Cambridge, sought by introducing compulsory examination in elementary subjects to prevent perfunctory reading of the higher subjects. Thereafter we observe two educational parties—one trying to train men to play a successful part in life; the other, to supply the scientific world with expert mathematicians for professorial chairs.

At first the whole examination was conducted *viva voce*. As the number of candidates increased, the *viva voce* method proved too slow and costly. The need for a close discrimination between large numbers of candidates, not greatly differing in ability, led to the introduction of an ever-increasing number of questions on paper, covering an expanding field of facts, and the allotment of marks, which, added up, established an order of merit by a comparison of totals differing sometimes by only a few figures. As the members still increased the screw was progressively tightened by enlarging the field of acquisition and deepening the obscurity of the tests until many of the examination questions of a body like the old university of London became, in Pope's satiric words,

... tricks to show the stretch of  
human brain,  
More curious pleasure, or ingenious pain.

Inevitably those candidates succeeded best who by nature could acquire the largest number of facts, retain them until the opening of the examination halls, and place them most rapidly on paper. On the other hand, examiners strove



to discover questions which had not been set before and could be marked with precision and speed. The use of this "ready reckoner" of ability was both fostered and abused by the call of democracy for some means of distinguishing merit apart from birth and parentage. Thus arose the competitive examinations for the Civil Service, the Navy and the Army, the emoluments of a university career, and latterly even for the acquisition of a stool in bank and counting-house. When also degree examinations ceased to be used as tests of teaching capacity, professional examinations in music, pharmacy, surveying, and so forth were introduced. School-leaving examinations and the submission of theses for degrees have been imported from the Continent.

#### Merits and Demerits

Though examinations have failed to accomplish their original purpose, they must not be regarded as an unmixed evil. They tell us little about moral qualities and tend to destroy spontaneity and originality. They overstrain the mind, particularly in "information subjects," to the serious detriment of physical development at a critical age. They foster false intellectual values by tempting both teacher and pupil to concentrate on one subject or a single group, in order to achieve some reward therein, a prize or scholarship, to the exclusion of general culture. They encourage memory far more than mind. Lastly, they have gathered round them a body of sterile scholarship which glories in a vast knowledge of dead tongues and a heap of learned antiquarian lumber valueless to the progress of true science and the growth and culture of the human heart.

Nevertheless, examinations must be credited with some good effects. They act as stimulants to the desire of excellence and development, both personal and intellectual, and force young minds to traverse intellectual paths which they would never have trodden for any other reason. A much examined man may remain a poor piece of humanity; but he will have come under valuable influences, have become acquainted with vast tracts of knowledge, and obtained a breadth of vision, if not a profundity of judgement, of which the untested man or woman is too often quite innocent. Lastly, they militate against loose thinking and inchoate knowledge.

With a view to improving secondary school examinations the board of education of England

and Wales has (Circular 996) undertaken "the functions and responsibilities of a coordinating authority," with the assistance of a Secondary-School Examinations Council of 18 persons, representing the leading universities and examining boards, councils, and associations. This Council will, under the coordinating authority of the board of education, deal with the recommendations of examining bodies, the maintenance of adequate standards of examination, the investigation of complaints thereupon from school authorities, the promotion of examination conferences, the form and contents of examination certificates, inter-university negotiations for equivalence of rival examinations, and the effecting of general improvements in examination schemes by bringing teachers into touch with examiners, by examining schools on their own syllabuses, and by taking into account the teachers' estimates of the merit of the candidates from their own schools (Circular 1002).

#### Remedies for the System

In view of the establishment of such a Council it may be well to state succinctly some obvious remedies for the faults of the present system. If the pupil's mind is not to be narrowed by the withdrawal of his interest and attention from all matters beyond the purview of the examination, its scope must be so limited that preparation for it occupies only part of his school time. Moreover, examination schemes must be frequently reviewed. If expository power is not to be paralysed, systematic training must be given in composition. The "chancy" nature of written examinations must be counteracted and the handicap of ill-health or nervousness removed by calling into council the teacher and learning the pupil's past record. Individual ability must be drawn out of the examination crowd by combining oral and practical tests with written answers. Multiplicity must give place to equivalence of school leaving and entrance examinations. The university rewards which are now the Dead Sea fruit of a sterile facility in passing examinations, must be given in future to men and women who have proved their ability to "teach" and to "discover" by actual performances.

In conclusion, examinations do not show men and women how to teach or write in the higher sense; but they do train them how to set down, clearly, succinctly, and rapidly, the facts which they have acquired and retained. If such

persons are not born with creative power, this acquired knowledge becomes mere "learned lumber." But, if they are born to do and to make, the acquisitions of the examination course and the habits of the examination hall may enable them to lay the foundation of deeds and works which the world will inscribe upon its scroll of honour. See Education; School; University.

W. K. HILL

**Examiner of Plays.** Official acting on behalf of the Lord Chamberlain, who has the theatres under his jurisdiction. A copy of every new piece, or alterations of old pieces intended to be revived, must be forwarded to him seven clear days before the intended production. No alteration of the text, when licensed, is permitted without express sanction. The selection of Charles Hallam Brookfield (*q.v.*) for the post in 1911 in succession to G. H. Redford amused many people and shocked others, for he had at one time been one of the chief adapters of frankly non-moral French comedies for the English stage, his *Dear Old Charley* (Newcastle, 1906), in particular, enjoying a *succès de scandale*. He was succeeded by George S. Street, the critic and essayist, appointed Dec. 30, 1913. See Censorship.

**Exarch** (Gr. *exarchos*, leader). In Byzantine history, a title specially applied to the military governor of the district of Ravenna in Italy. The exarch has been compared to the viceroy of India. The direct representative of the emperor, he commanded the troops, controlled the civil administration and finance, and exercised great influence in ecclesiastical affairs. The exarchate of Ravenna lasted from 584-752.

There was also an exarch of Africa, the earliest mention of whom occurs in 591. The name exarch was also given to a dignitary of the church who held a position below that of the patriarch, but above that of the metropolitan, and to the head of certain monasteries, and survives as the title of the patriarch of Bulgaria.

**Excalibur.** King Arthur's magic sword; called Caliburn and made in the isle of Avalon. In the *Morte d'Arthur* the King takes the sword from the hand of the Lady of the Lake, and learns that its name signifies Cut-Steel, and that while he has the scabbard he can never be sore wounded and cannot lose blood. When stricken down in the final battle, Arthur commanded that the sword be thrown into the lake, where it was caught by a hand and vanished. See *Morte d'Arthur*.

**Excambion.** Term used in Scots law for an exchange of lands. The law allows this to be done in the case of entailed property, as well as unentailed, several statutes to this effect having been passed. It is often done to make boundaries and the like more convenient.

**Excavation.** In engineering, term used for the removal of material for building and other purposes. In nearly every branch of engineering excavation work occurs, from the sinking of a well to the construction of huge reservoirs, ship canals, railway tunnels, etc.,

several tons each, and work on a face 12-16 ft. high. This machine, usually self-propelling, has in front a swivelling jib made up of two powerful girders, between which swings the back end of a beam.

To the forward end of the beam is attached a large steel scoop, holding up to five cubic yards of material, and provided with a flap bottom that can be tripped by pulling on a cord. The mechanism includes gear for revolving the jib; racking the beam inwards or outwards to vary the reach of the shovel; and lifting the

shovel by means of a chain or cable passing over the end of the jib. In operation the scoop is lowered to about rail level, and thrust forward while being lifted. At the end of the stroke, the jib is swung to bring the scoop over a dirt car, and the contents are dumped by releasing the bottom.

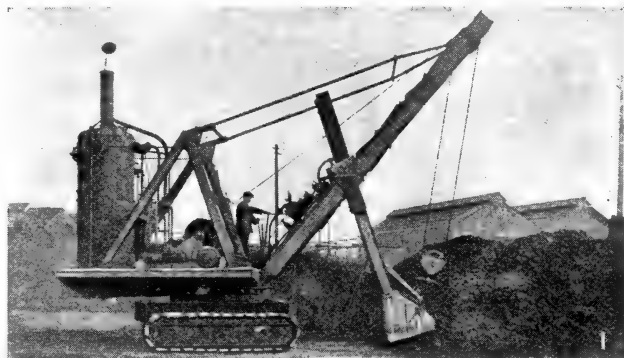
In the hands of skilful operators a shovel will pick up and deliver four loads per minute. A ninety-ton machine, controlled by three men, can move 3,600 tons a day, performing the work of 2,000 hand labourers. An immense amount of excavation was done on the Panama Canal works by these giant diggers in combination with mechanical unloaders which enabled ten men to clear in a day as much as would have kept 500 men busy with shovels. The steam-navvy is found very valuable for purposes other than those of civil engineering, being widely used for stripping the useless "overburden" of surface deposits of coal and iron ore, digging ore and phosphates, and excavating dry gold-bearing gravel in "placer" mines.

Another excavator, used chiefly for earth and gravel, is the French navvy, which moves on rails along the top edge of the cut, drawing the spoil towards it in an endless chain of buckets running round a sheave at the end of a jib-supported ladder. The buckets excavate while travelling upwards under the ladder, and the spoil is discharged into a shoot, or on to a belt-conveyer for delivery to cars, or directly on to a dump. As excavation proceeds, the ladder is lowered gradually till the full depth commanded by the machine is reached. The excavator then lifts

involving the use of tools from the simple pick and shovel to giant excavators (*q.v.*), dredges, etc.

Excavation problems are among the most difficult the engineer has to solve, the mere task of removing the material being a simple one compared with the difficulty of preventing the sides of the excavation from collapsing. The excavation of the Panama Canal (*q.v.*), involving the removal of 175,000,000 cubic yards of material, was considerably delayed for this cause. The original plans were altered because the soft earth could not be prevented from spreading. Great masses of earth, constituting the adjoining banks in the deepest parts of the Culebra Cut, slid down into the canal, necessitating constant dredging to restore navigation. Excavating is an important part of archaeological work. See Archaeology; Canal; Dredging; Foundation; Tunnel; also *illus.* pp. 811 and 813.

**Excavator** (Lat. *ex*, from, out; *cavare*, to hollow). Mechanism for removing large masses of earth. Some of the digging machines used closely resemble the various kinds of dredgers. The spoon dredger has its counterpart in the steam-shovel or steam-navvy, which will deal with anything from soft earth to lumps of blasted rock weighing



Excavator. Crane navvies on mountings suitable for various types of work. 1. With caterpillar travelling gear. 2. On road wheels. 3. Mounted on rail wheels

By courtesy of Ruston & Hornsby, Ltd.

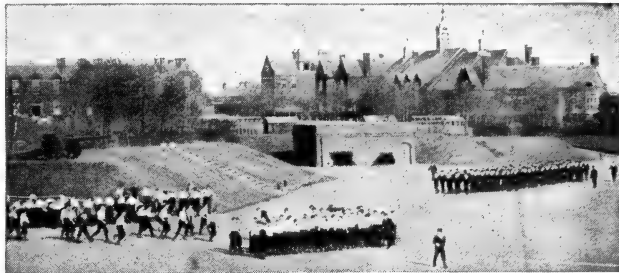
the ladder, moves forward a little, and takes a fresh cut. This type of digger is very effective for canal and dock work.

The latest form of mechanical excavator for surface work is a rotary machine. It travels on two main traction wheels at the rear, and on a forward steering wheel, the height of which can be adjusted. In the space between the traction and steering wheels the frame supports a spokeless excavating wheel of large diameter, with buckets mounted on its circumference. It revolves in a fore-and-aft plane, making a cut, as the machine moves forward, 6½ ft. wide and from 1 ft. to 5 ft. deep, according to the adjustment of the steering wheel, which is supported by the undisturbed ground. A belt-conveyor, running transversely through the wheel, receives the spoil and empties it at one side into cars or on to a heap. The capacity of the machine is 325 cubic ft., or about 16 tons, of material per minute.

An apparatus with a scoop wheel working in the manner just described, but mounted on a four-wheeled frame like that of a traction engine, has proved very successful in excavating ditches or trenches for water and drain pipes. The scoop wheel revolves between the arms of a falling jib at the rear of the machine. The "ditcher," as it is called, will deal with any kind of ground that can be moved with a pick, even macadam road, and will cut through buried roots and logs. The largest machines excavate trenches 4½ ft. wide to a depth of 12 ft. A correct grade is maintained by means of the jib gear and a sighting-box on the wheel frame.

Some sections of the London "tube" tunnels were driven by an electrically operated rotary boring digger, a transverse wheel with six radial arms carrying chisels and scoops. Rotary motion is imparted to the wheel by pinions engaging a circumferential rack. The cutting chisels loosen the material, which falls into the invert and is picked up by the buckets and emptied on to a belt-conveyor. See Engineering.

**Excellency.** Title of honour, formerly applied to emperors, kings, princes, and other high personages. In modern British usage it is confined to the governor-general of India, the lord-lieutenant of Ireland, colonial governors, and ambassadors and envoys. In France and the S. American republics the president is styled Excellency, but not in the U.S.A. The Italian *eccellenza* is a common mode of addressing strangers.



Excellent. Parade ground of the chief school of naval gunnery on Whale Island, Portsmouth Harbour

*Cribb, Southsea*

**Excellent.** Name of a British warship, and of the chief school of naval gunnery, also known as Whale Island. It is situated in Portsmouth Harbour on a small island made up largely of earth excavated for the construction of new docks. In the Excellent gunnery school officers and men are trained as specialists.

The Excellent, a 3rd class gunboat, built in 1870, displacing 508 tons, with one 7.5-in. and one 4-in. gun, took part in the bombardment of the Belgian coast in the early months of the Great War.

**Excelsior.** Lyric poem by H. W. Longfellow, published in *Balads and Other Poems*, 1841. It is intended to show the life of a man of genius, resisting all temptations, laying aside fears, heedless of warnings, and pressing right on to accomplish his purpose. After every warning, in the face of every temptation, he repeats his motto, *Excelsior*, higher; and then perishes without having reached the perfection he longed for. The voice

heard in the air at the close is the promise of immortality and progress ever upward.

**Excess Profits Duty.** Tax levied by the British Government to meet the expenses of the Great War. It was first imposed in Sept., 1915, when all excess profits made in business were taxed at the rate of 50 p.c., the amount being raised to 60 p.c. in 1916 and to 80 p.c. in 1917. Excess profits were defined as those in excess of the average made in the two or three years before the outbreak of war, and the tax was not charged on the first £200. Farmers and professional men were not liable to the tax, which in the financial year 1919-20 produced £290,045,000. A similar tax was introduced in Canada and Australia, and in several foreign countries. The duty, reduced to 40 p.c. in 1919, was raised to 60 p.c. in 1920. The duty was very unpopular and by Sept. 20, 1920, there was a drop of over twenty millions in the estimated total. It was abolished in Mar., 1921.

## EXCHANGE: INTERNATIONAL FINANCE

Ellis T. Powell, D.Sc., Author of *The Mechanism of the City Banking; Credit; and Money* are articles which deal with subjects of kindred interest. See also *Bill of Exchange* and the articles on the great banks, both British and foreign

The science of the foreign exchanges is concerned with the transformation of the currency of one country into that of another. The exchange is necessary in order to adjust the international obligations which arise from the worldwide operations of finance, industry, and trade.

Giving change for a sixpence is proverbially unprofitable; nobody here and now will give more than sixpence for sixpence. But sixpence here may be worth more or less than sixpence somewhere else, while sixpence now may be worth more than sixpence in three months' time. This principle is the key to the mysteries of the foreign exchanges, the machinery by which money in one country is trans-

formed into money of another. By money we mean coin, or else some instrument or document—a cheque, bill, or note, for example—convertible as of right into coin.

I want to pay 15s. to McGinty in Glasgow. I could, if I liked, send him a 10s. currency note and two half-crowns in a registered letter; but this is cumbersome. The ideal method is to find somebody in Glasgow who owes me 15s. and tell him to pay it to McGinty. Unfortunately, I have no debtor in Glasgow; but I know an individual who does possess large funds there, and it occurs to me that I might buy 15s. of his Glasgow money with my London cash. This individual with the large Glasgow balances is the postmaster-general.

At a post office I buy a Glasgow claim for 15s., paying the postmaster-general an extra 1½d. beyond the 15s. for the convenience he has afforded me. This claim on the postmaster-general's Glasgow balances, called a postal order, I send to my creditor. In due course he cashes it and is perfectly satisfied. This was an exchange transaction, a transformation of London money into money somewhere else. What I bought was, in fact, a bill of exchange drawn by the postmaster-general upon his balances in Glasgow.

In ordinary circumstances the postmaster-general's balances at Glasgow are sufficient to meet all demands. But suppose that circumstances create an abnormal number of remittances to Glasgow, so that the postmaster-general has to make special arrangements involving extra expense and labour for dealing with them. It is conceivable that he must then raise the price which he charges for the means of making remittances to the north. Instead of selling a 15s. bill or order for 15s. 1½d., he must demand 15s. 3d. or 15s. 6d. In the language of the foreign exchanges we should say that the London-Glasgow exchange was moving against London, because a given amount in the metropolis was exchangeable for a less in Glasgow.

#### A Hypothetical Example

In the supposed instance why should the London-Glasgow exchange move against London? Simply because so many London people were anxious to acquire claims to Glasgow money in order to meet their obligations there. Finding such a strong demand for Glasgow money, the postmaster-general put up the price at which he was willing to sell his Glasgow balances. For some commercial reason everybody was desirous of providing funds in Glasgow to pay for goods bought there; consequently people like the postmaster-general with money in Glasgow were besieged by London buyers of their Glasgow funds. Bills on Glasgow were eagerly snapped up; people were bidding for them against one another. The result was that the price of Glasgow money went up; the London-Glasgow exchange moved against London. Let us turn from this simple illustration of the principle, to its working throughout the business world.

If English exporters, at a given time, had sent so large a quantity of commodities to France as to create the necessity for unusually extensive remittances to London in payment thereof there will arise

an insistent French demand to exchange francs in Paris for sovereigns in London. The price of the sovereign, as expressed in francs, will advance. Now the Paris exchange, as quoted, expresses the price of the sovereign in francs; therefore the higher it goes the cheaper do the francs become, since the sovereign will buy more of them at the higher quotation than at the lower. This is what is meant when the Paris exchange is said to move in favour of London.

#### Exchange Quotations

At the same time it must be remembered that some of the exchanges—the Portuguese, for example—are quoted the other way round. While the Paris exchange is francs to the sovereign, the Portuguese exchange is pence to the milreis. This reversal turns the whole process upside down, with the result that the lower the quotation the better for the English buyer of Portuguese currency, since it increases the amount which he can purchase in Lisbon for a given sum in London. The varying methods of quoting the exchanges are at first sight perplexing. The inquirer will discover, however, that in the quotations of the foreign exchanges in the daily newspapers the exact significance of the figures is indicated. He is informed, for instance, that the Amsterdam exchange is quoted florins to the £; that of Hong Kong is the value of the dollar in shillings and pence. In theory, of course, these transactions are exchanges of money for money; but the buyer of London sovereigns in Paris will get a draft or bill of exchange on a London firm or bank. Hence the French exchange quotation is for Paris cheques. This represents the money, and is in due course transformable thereto. The element of time, as well as of an alien currency, has to be taken into consideration. Some of the exchange quotations in the current lists are for so many days' sight. They represent the price asked on a given date for English pounds payable in London after the expiration of 90 days, plus the days of grace.

As the speed of modern business tends ever to accelerate, there has arisen a need for a quicker remittance from distant points, than is represented by a draft payable at 60 or 90 days. Hence the "T.T." quotations in the published lists of exchange rates, i.e. the prices of telegraphic transfers. They stand for the terms upon which the exchange dealer in Shanghai, for instance, will buy or sell sovereigns in London, the money to be pay-

able as soon as the cable can carry instructions to the London agent.

This element of time is important. Obviously a Rome draft on London, payable eight days after sight, or really 11 when the days of grace are added, will not be worth so much in the Italian capital as a sight draft on the same place. In the one case the recipient of the draft can get his money at once across the London counter. But with the draft at eight days' sight he must wait 11 days before he handles the coin. Similar principles operate between countries employing the same currencies. The price of the English sovereign, as expressed in terms of its Australian brother, undergoes a constant fluctuation. So again, large remittances from New York to Chicago will send up the price of the Chicago dollar as expressed in the New York dollar.

#### The Gold Point

In our preliminary illustration the postmaster-general gradually raised his London price for Glasgow money. But he could not go on doing this indefinitely. If he advanced his charges beyond a certain rate, it would pay better to send coin or notes to Glasgow by registered letter, or by train, than to buy his Glasgow bills. The cost of remitting coin is easily calculable. It is the value of the coin, plus freight, insurance, and the expense, in large remittances, of packing and unpacking. Unless the postmaster-general keeps his charges below the aggregate of these expenses, people will send coin and notes to Glasgow in preference to buying postal remittances. If £150 in notes or gold can be sent to Glasgow for £1 in freight, insurance, and expenses, nobody will pay a commission of £1 10s. to the postmaster-general.

The same principle holds good in international exchange. If the Paris price of English money rises above a certain point, the exchange dealers will ship gold to London. They can then sell, in Paris, the English money obtained for their gold. With the rate at its supposed high figure, they would make a profit, since they would get more for their English coin than it had cost them in shipping, insurance, and expenses. The rate of exchange which tends to encourage the transit of bullion, in preference to the purchase of bills, is called the gold, or specie, point.

Bullion, however, is not invariably remitted whenever this point is passed. Other factors in the international monetary situation may prevent this. Certain governments, e.g., place obstacles

in the way of the export of gold. Consequently their subjects might be deterred or prevented from making remittances in specie, although the rate of exchange had passed the gold point.

We can now discern the *modus operandi* of the exchange market. There is a demand, constant in kind but variable in intensity, for the means of meeting claims in every centre of commercial activity. Bankers and brokers specialise in the practice of buying remittances. They know who is likely to have them for sale. Frequently they sell their own foreign balances and embark upon various delicate operations in order to restore them. For more than a century, however, there has been a tendency to settle all international indebtedness by means of bills on London, and it has been the policy of London to honour all international obligations in gold.

Until the outbreak of the Great War in 1914 this availability of gold was an unbroken tradition. Occasionally the workings of international finance led to the prospect of a shortage in London's gold resources, but that state of affairs was remedied by raising the Bank of England rate so as to attract gold from abroad by the offer of higher interest. The effect of this gold-paying policy was to render the draft on London negotiable throughout the world, and to create a preference for it as against drafts on any other monetary centre. The possessor of a sound draft on London knew that it was as good as gold; he lacked this assurance if he held only a draft on Berlin or Paris. The effect of this knowledge and preference was to stimulate the settling of all international obligations by drafts on London, rather than by drafts on the place where the business which created the obligation had actually been done.

A fine (i.e. absolutely first-class) bill of exchange, payable at a future date, is clearly an instrument whose usefulness is not confined to the original holder. If he requires the money forthwith, he can discount the bill with his banker. The banker will, however, pay more for it if it is accepted by some firm of the highest repute. From this fact has arisen the practice, on the part of banks and certain eminent mercantile firms and finance houses, of systematically accepting approved bills, in return for a commission. Firms who specialise in this class of business are known as accepting-houses.

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schen, new ed. 1896; A B C of the Foreign Exchanges, G. Clare, 4th ed. 1905; Money, Exchange and Banking, H. T. Easton, 2nd ed. 1907; Money Changing, H. Withers, new ed. 1915.

**Exchange.** Name given to a building wherein merchants meet for the transaction of business. It is frequently referred to as 'Change and is the equivalent of the French *bourse*. Prominent among such buildings is the Royal Exchange, London. In modern times many forms of business have their own exchange. There are stock exchanges in London, Montreal, Sydney, Johannesburg, and other large cities. London has a hop exchange and a coal exchange, while many towns have a corn exchange. See Stock Exchange.

**Exchange** (Lat. *ex*, out; late Lat. *cambiare*, to change; Fr. *échange*). As a legal term this has two principal meanings. Exchange of lands in England is effected by deed of exchange. A true deed of exchange demands that like shall be given for like, though not necessarily in value: a freehold for a freehold, leasehold for leasehold, copyhold for copyhold. The parties to the deed must actually enter upon the property to complete the transaction; so that the deed is void if one party to the deed dies before entry. Exchange of livings by incumbents is allowed by ecclesiastical law. Each incumbent resigns his living into the hands of the bishop, who then inducts them both into their new livings; but, as in exchange of lands, if one dies before both are inducted, the exchange becomes null and void.

**Exchange, MILITARY.** Term designating the privilege extended to officers of the regular and Indian armies of exchanging with one another from one unit or corps to another. Officers desiring to exchange must forward their applications to the War Office, stating their reasons, and accompanied by the recommendations of the commanding officers concerned, who must certify that the exchange does not originate through any question affecting the honour, character, or professional efficiency of the applicants. Medical certificates are also required stating that the officer is in a fit state of health for duty in the locality where the unit to which he desires to transfer is stationed. Exchanges, when sanctioned, are notified in The London Gazette. Exchanges are usually made for private reasons, and are made between officers of similar rank. See Commission.

**Exchange and Mart, THE.** Name sometimes given to the London paper, the full title of which is *The Bazaar, Exchange and Mart (q.v.)*.

**Exchequer.** Name given in England to the department entrusted with the duty of receiving the royal revenues. The word means a chess board because it was by means of a device of this kind that the early accounts were kept. The late Lat. equivalent is *scaccarium*, and the *Dialogus de Scaccario*, a treatise of the time of Henry II, gives most of our existing information about the early exchequer. The sittings were held at Winchester and then at Westminster.

The early kings had both a treasury and an exchequer, and the functions of the two have been somewhat intermingled even until the present day. The *Dialogue* tells how the exchequer met, the justiciar, treasurer, chancellor, and other high officials with their clerks attending its meetings, how the receipts were entered on rolls, and how tallies were used in this connexion. It met twice a year, at Easter and Michaelmas, and its main dealings were with the sheriffs who attended to account for the royal revenues which they had collected or failed to collect. In addition to this court there was a lower exchequer, which was a permanent department and in practice a branch of the treasury.

Gradually certain changes were introduced. The treasurer took the place of the justiciar as its president, and then these high officials ceased to attend its sittings in person. The seal, hitherto held by the chancellor, was given to a new official, and the chancellor of the exchequer came into being. The chief members were known as barons, and as they began to hear cases affecting the revenue, they resolved themselves into one of the regular courts of law, the court of exchequer, with a court of appeal, the court of exchequer chamber, which existed from 1357 to 1830.

As the country became richer, the duties of the exchequer became more varied and numerous. It dealt not only with the accounts of the counties, but with others which concerned the royal revenue. The exchequer continued in existence until the 19th century. It collected and paid out the royal income and expenditure, while its five barons, under a chief baron, heard cases as a court of law.

In 1834 great changes were made, the old exchequer being practically abolished, the paymaster-general taking over its



duties. A new exchequer was set up, but this was an audit office, and in 1866 the present exchequer and audit office was established. The name exchequer remains in several connexions, exchequer bonds, etc., but the main financial work of the country is done by the treasury, whose actual head, however, is the chancellor of the exchequer, and not the first lord of the treasury. The court of exchequer lasted until the legal reforms of 1876.

Scotland and Ireland had each their exchequer and their court of exchequer on the English model. The union of both kingdoms with England made these separate institutions unnecessary, although the Irish exchequer lasted until 1817, and the Scottish court of exchequer until 1856. *See* National Finance; Treasury.

**Exchequer and Audit Department.** Government department under the comptroller and auditor-general. His business is to see that all public money is expended in accord with the wishes of Parliament. Without his authority no money is paid out of the exchequer. He is also the national auditor, bound to notify any irregularities in his annual report to the House of Commons. The office, established in 1866, took over the duties formerly discharged by the comptroller-general and the commissioners for auditing public accounts. He can only be dismissed at the request of both Houses of Parliament. His offices are on Victoria Embankment, London, E.C.

**Exchequer Bill.** Form of British Government security in vogue from 1696 to 1896. First issued under William III, when metal money was scarce owing to the reform of the coinage, they were really promissory notes for money borrowed by the Government from capitalists. They usually ran for five years, but were sometimes repaid earlier, and taxes could be paid with them; the rate of interest varied, but they were free from any risk of depreciation. Their place was largely taken after 1877 by Exchequer Bonds; the last bills were paid off in 1896. *See* National Debt; National Finance.

**Exchequer Bond.** Form of British Government security first issued in 1853. They are promissory notes issued generally for three or five years, and redeemable at par. During the Great War much money was raised by the sale of these bonds; most of them bore 5 p.c. interest, but at one time 6 p.c. bonds were sold. An attempt was made to sell them through the Post Office to the small investor,

as advised in 1916 by a committee on war savings for this class. To do this they were issued in bonds of £5 and multiples of £5; after the issue of the National War Bonds in Oct., 1917, the special need for them ceased. In 1920, however, an issue of five-year bonds, carrying 5½ p.c. interest, was made. *See* National Debt; National Finance.

**Excise** (Lat. *ad, to; census*, a tax). Name given to taxes levied on goods produced within a country, as opposed to customs, which are taxes on goods coming into it from without. The early taxes of both kinds were known as customs, and for long there was a similar loose use of the word excise, but the distinction is now generally recognized. In the time of the Civil War the parliamentary party introduced the first excise duties, placing them on ale, beer, and other beverages and then on salt, starch, and certain victuals. Some were removed in 1649.

During the 18th century the number of excise duties was increased. In 1711 they were placed on soap and paper; in 1746 on glass; then came bricks, candles, etc. In the 19th century the process of reducing and simplifying these began, and to-day the number of articles so taxed is very few. In 1917, to meet the cost of the Great War, excise duties were laid on table waters, entertainments, and matches. The following figures show the classes and net receipts from the excise duties in the U.K. for year ended Mar. 31, 1921.

Beer . . . . .	123,393,903
Spirits . . . . .	53,907,633
Patent Medicines . . . . .	1,369,730
Licences . . . . .	4,278,742
Table Waters . . . . .	1,180,784
Entertainments . . . . .	11,735,840
Matches . . . . .	2,155,554

This money is collected by the board of customs and excise. *See* Customs; National Finance, Taxation.

**Excise Bill.** Measure introduced by Sir Robert Walpole in 1733 for the substitution of an excise instead of a customs duty on wine and tobacco. His object was to lessen smuggling and, by making the ports free, to stimulate a re-export trade. The bill aroused much opposition and was withdrawn.

**Exciter.** Generator for producing electric current for exciting the field magnets of an alternator or a dynamo. In the case of alternators, the field magnetism of which it is difficult to excite by current generated by the alternator itself, the exciter may consist of a separate dynamo. Direct current dynamos are usually self-excited, *i.e.* their magnetic fields are produced by their own current. *See* Dynamo.

**Exclusion Bill.** Measure introduced into the English Parliament in 1679 for the purpose of excluding James, duke of York, from the throne. The country was greatly excited by Titus Oates' story of a Roman Catholic plot, and the bill was introduced, Mary and William of Orange being named to succeed Charles II. To save his brother, Charles dissolved Parliament, but the bill was again brought forward in 1680 and passed by a large majority in the House of Commons. The Lords rejected it; and a proposal to substitute the duke of Monmouth for James led to its abandonment in 1681. *See* James II; Monmouth.

**Excommunication** (Lat. *ex, out of; communis, common*). Term used specifically for the temporary or permanent exclusion of an offending member from the fellowship of the Christian Church. Generally it means exclusion from any organized community. Examples are to be found in the history of the Jews (Lev. 13; Num. 9 and 12; Ezra 10). It existed among Greeks, Romans, and Druids, and has affinity in the tabu of the Polynesian islanders.

The Christian Church claims Scriptural authority for excommunication (Matt. 16 and 18; John 12 and 16; 1 Cor. 5). Imposed first by the community and then by the bishops as a penalty for heresy, immorality, or disobedience, its primary objects were the bringing of the offender to repentance, and the protection of the Church from corrupting influences. In pagan and Christian usage it has been imposed in degrees of varying severity, ranging from admonition to temporary and partial suspension, and, finally, anathema (*q.v.*).

Gregory VII first claimed the right to depose kings by excommunication, and an ecclesiastical authority could place a whole country under an interdict. Papal claims of this nature led to much trouble in Elizabethan England.

In the Roman Catholic Church excommunication is now provided for by the constitution Apostolicæ Sedis, 1869, ratified Jan. 6, 1884. The Anglican view is represented in Hooker's Ecclesiastical Polity and Canons 65 and 68. At one time in England, after a person had been under excommunication for 40 days he might, on the issue of a certificate of the diocesan authority to the court of chancery, be imprisoned on a writ of *excommunicato capiendi* until he submitted and was absolved, and the sentence carried with it a number of civil disabilities. By an Act of George III, 53, c. 127, it was

provided that no person excommunicated could be imprisoned for more than six months and that no civil incapacity should be imposed.

By 54 George III, c. 68, a similar law was enacted for Ireland. Civil penalties were abolished in Scotland in 1690. In Great Britain, though disciplinary jurisdiction of the eccles. courts over the laity exists still, it is subject to statute and common law, and excommunication in the old sense is virtually obsolete. In recent times imprisonment has been imposed only in cases of ritualistic disobedience. In the Scottish Presbyterian churches, lesser excommunication is an affair of the kirk session; the greater excommunication is a prerogative of the presbytery.

Modern cases of excommunication were those of Bishop Colenso (*q.v.*), 1863, whose deposition was negated as invalid by the Judicial Committee of the Privy Council in 1865, and of Father George Tyrrel for his criticism of Pius X's encyclical against modernism (*q.v.*) in 1907. Notable excommunications in earlier times were those pronounced by Gregory VII against the emperor Henry IV, 1077; Innocent III against King John of England, 1208-14; Gregory IX against the emperor Frederick II, 1228-45; Julius II against Louis XII of France, 1570; Leo X against Luther, 1521; Paul III against Henry VIII, 1535; and Pius V against Elizabeth, 1570.

**Excoriation** (Lat. *ex*, from; *corium*, skin). Superficial destruction of the skin (*q.v.*).

**Excursion** (Lat. *excursio*, running out). Popular name for a brief holiday. In the United Kingdom and other countries previous to the Great War, the railways gave special facilities to those who desired to visit various seaside and other pleasure resorts for short periods. They issued excursion tickets, at low rates, the day excursion to Brighton and back from London being only 3s. The Great War put an end to these excursions, but in 1920 the running of day excursion trains on certain railways was resumed. Single fare was charged for the double journey. Thomas Cook was the pioneer of the cheap excursion traffic. *See* Railways.

**Excursion, THE.** Blank verse poem by William Wordsworth. Published in 1814, it forms the second part of a projected work in three parts entitled *The Recluse*, conceived as a philosophical poem on Man, Nature and Society. Wordsworth never wrote the third part, but *The Prelude*, an introduction, and the first book of the

first part of *The Recluse* were published posthumously in 1850 and 1888 respectively.

**Exe.** River of Devon, England. It rises in Somerset on Exmoor and flows right across Devon, mainly S., to the English Channel, which it enters by a navigable estuary 6 m. long. Exeter stands on it, as does Tiverton, while Exmouth is at the mouth of the estuary. Its length is 55 m. Its chief tributaries are the Barle and other streams that rise on Exmoor. A ship canal, 5 m. long, connects Exeter with Topsham, from which point the river is navigable. There is some trout fishing in the Exe, which flows mainly through wild and beautiful scenery.

**Execution** (Lat. *exsequi*, to follow out, carry out). Act of performing anything. It is used in law (*see* below), and also in other senses, as in executing a commission, or the execution of a piece of music. In a special sense the word has come to mean the carrying out of a death sentence. In England the death penalty was carried out mainly in two ways, by hanging or by beheading. The former was the fate of the ordinary offender. Beheading was reserved for political offenders and persons of rank.

When, in course of time, the death penalty was confined to serious crime, hanging became the only form. For long these executions were a public spectacle to which thousands flocked, but in 1866 a royal commission recommended that they should be carried out in private, and this change was quickly made. Burning and drowning were also practised in former days. In France the guillotine is adopted for executions, while electrocution has been used in the U.S.A. *See* Capital Punishment; Electrocution; Guillotine.

**Execution.** In English law, term generally used to mean the carrying into effect of the judgement of a competent court. In civil cases this is done by the successful litigant applying to the court for a writ of execution, which as a rule can be had for the asking at an office attached to the court. Some kinds of execution, however, require an order from a judge or judicial officer. Execution is also used in the sense of perfecting a legal document by signing, sealing or delivering it with all proper formalities.

**Executive.** Name given to a body of men who carry out the orders of others. In most modern states there is a sharp distinction between the executive and the legislature; the latter making the

laws which the former carry out. In the United Kingdom the executive consists of the Cabinet and the various state departments under its control. The local government bodies have also a legislature and an executive. *See* Cabinet; Government; Parliament.

**Executor.** In English law, the person or persons appointed by a will to carry into execution a will as the "legal personal representative" of the deceased. An executor becomes the legal owner of all the deceased's property. He must first prove the will. Armed with the probate copy thereof he collects the property, realizes enough to pay (1) funeral and testamentary expenses; (2) debts, crown debts coming first; (3) legacies in order; and then hands over the balance to the persons entitled under the will.

If the will does not completely dispose of it, the executor must share the balance or residue of personality amongst the next of kin; and hands the freeholds to the heir-at-law. He must not dispose of realty to pay debts unless specially empowered by the will to do so; or unless the personality is not enough. When an executor has paid out all the assets to creditors he is not liable for any debts he may have left unpaid, unless he has paid one of a lower class of creditor, a simple contract debt, before paying a higher, a crown or specialty debt. That is, he is not bound, as between one creditor and others of the same class, to pay them rateably if there is not enough for all. He is allowed a year to wind up the estate before any legatee can sue him for his legacy. *See* Will.

**Executory.** Term used in English law in two senses. An executory contract is one which consists of a promise on both sides, *e.g.*, I will make you a chair if you will pay me £10 for it. An executory devise or bequest is a gift of land by will, without the intervention of a trust, where the estate of the devisee, or the legatee if a leasehold, is to arise upon a contingency.

**Exegesis** (Gr., explanation). Branch of study concerned with the interpretation of Holy Scripture. Properly including all that is connected with the full exposition and understanding of the Bible, it is more commonly restricted to literary interpretation, which determines the sense of the sacred text upon the same principles that would be applied to any other literary work. It differs from Biblical criticism in taking the text as it stands, and examining its meaning rather than its origin and authenticity. Being concerned not merely with the precise meaning of the

text, but with the doctrines and practical inferences to be drawn from it, the study of exegesis is an extensive one.

Exegeses have from early days been divided into two classes: the Literalists took the statements of Holy Scripture in their literal and grammatical meaning; the Allegorists found an inner and spiritual signification underlying the obvious meaning of the text. The N.T. writers afford many examples of the influence of this school. For example, many O.T. passages are applied to Christ which obviously referred originally to contemporaries of the writers. The two schools were long in antagonism, believers in verbal inspiration naturally demanding a literal interpretation of the text of Scripture; while the medieval tendency to read sacramental doctrine into every text of Scripture led to the most far-fetched allegorisation.

The history of exegesis shows a great activity of commentators among both Jews and Christians in the days of the Early Church; but little was done during the Middle Ages. The allegorical interpretation of a few favourite texts was the subject of most of the books and sermons that could be called exegetical; and collections of patristic comments replaced critical investigation. The Reformation saw a great revival of Bible study, and most of the commentators of this period belonged to the literal school. This may be largely attributed to the need for proving from Scripture the doctrines that were now emphasised, as opposed to accretions to primitive doctrine which owed their existence mainly to allegorical exegesis. See Bible; Criticism.

**Exelmans, RÉMY JOSEPH ISIDORE, COMTE D'** (1775 - 1852). French soldier. Born at Bar-le-Duc, Nov. 13, 1775, he joined the Revolutionary armies in 1791, becoming a captain of cavalry in 1799, after his courageous behaviour during the Italian campaigns. On Murat's staff from 1801, he was promoted general after Eylau, 1807, the climax of his active service during the campaigns in Prussia and Poland. Captured in Spain, he was held a prisoner in England from 1808-11. He took part in the Russian expedition, 1812, and in the fighting in France in 1814. At Waterloo he commanded a cavalry corps, and after the Bourbon restoration lived abroad in exile until 1823. His high reputation, however, led to his restoration as a peer of France, 1830, and to his elevation to the rank of marshal. He died Nov. 11, 1852.

**Exemption** (Lat. *eximere*, to take out). Term used in Britain during the Great War for freedom from compulsory service. Under the various Military Service Acts, 1916-18, all men within prescribed age limits were liable to join the forces unless they had secured exemption. Married men, for example, were not liable under the first Act, which came into force in Feb., 1916, nor were doctors and clergymen. Other grounds of exemption were medical and compassionate, as in the case of a man the sole support of dependents, and men in industries essential to the successful prosecution of the war. Tribunals set up under the Act granted either temporary or complete exemption, according to the circumstances of the applicant. A second Service Act, which came into force in May, 1916, did away with exemption for married men, as such, though they were protected in the same way as single men on compassionate and occupational grounds. Conscientious objectors, married and single, if they satisfied the tribunal, were exempted from combatant service only, as was the same class in Australia and S. Africa.

Meantime many men were being exempted on medical grounds in somewhat haphazard manner, and in 1917 a Military Service (Review of Exceptions) Act was passed. All men previously medically exempted were re-examined, the examination was more thorough, and only men definitely rejected by a qualified army doctor were exempt. As the need for men became more pressing many semi-skilled and unskilled men had their exemptions taken away. An Act of Jan., 1918, enabled the Government to take into their own hands the whole question of exemptions of men on an occupational basis, as hitherto the Trade Unions had partly undertaken this. A final man-power bill, introduced into Parliament April, 1918, raised the age limit to 50, and removed the exemption hitherto granted to duly qualified medical practitioners up to the age of 56. In France and other countries exemption from service was granted on certain medical grounds and to only sons. See Certified Occupations; Compulsory Service; Man-power.

**Exercise** (Lat. *exercitium*). Movements of the muscles, either voluntary or passive. Voluntary exercise means deliberate movement; passive exercises are movements effected by the manipulation of another person or by a machine. Muscular contraction, such as occurs during steady walking, stimulates the circulation of the

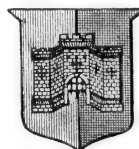
blood through the muscles. This, in turn, acts on the heart and the respiratory system, which both act more vigorously. The formation of more waste products in the tissues makes increased demands upon the excretory system.

Severe exercise is beneficial to the young and healthy, but should not be undertaken by persons beyond middle life or those suffering from cardiac or other serious affections. Heavy muscular effort, long continued, such as that of a blacksmith, tends to produce a thickening of the walls of the arteries, which may eventually lead to heart disease, apoplexy, and other diseases, especially if associated with alcoholism or syphilis. Regular daily exercise is an important adjunct to medical treatment in obesity, gout, digestive disorders, insomnia, neurasthenia, and other nervous affections. Suitable exercises are of value to children and young persons, to strengthen the muscles and correct wrong methods of carrying the body, which may have resulted from weakness or curvature of the spine, and other affections which may follow rickets or malnutrition.

Passive exercises are mainly employed to prevent wasting of the muscles and stiffening of the joints following sprains of the bones or other injuries to limbs, and to increase the mobility of joints in those suffering from rheumatism or similar conditions. See Physical Training; also illus. p. 2718.

**Exeter.** City, county, parl. and mun. bor., county in itself since 1537, river port, and county town of Devonshire, England. It stands on the Exe, 171½ m. W.S.W. of London, on the L. & S.W. and G.W. Rlys. Still partly surrounded by its old walls, it occupies an elevated position on a ridge of land overlooking the Exe.

The chief attraction of the city is its comparatively small but magnificent cathedral, with massive Norman transeptal towers (a unique feature except for a copy in the collegiate church at Ottery S. Mary), dating from the 12th century; the remainder of the edifice was transformed between 1280 and 1370 from the Norman to the Decorated style, and a complete restoration was undertaken by Sir G. G. Scott towards the end of the 19th century. Among other interesting buildings are the guildhall, rebuilt in 1330, the episcopal palace, the College of Priest Vicars,



Exeter arms



Exeter. West front of the cathedral and the 14th-15th century screen ornamented with sculptured figures of Biblical characters

S. Nicholas Priory, the remains of Rougemont Castle, and Royal Albert Memorial Museum, Library and Art Gallery.

The chief educational establishments in the city are the Royal Albert Memorial College and Exeter School. The former, which is affiliated to the universities of Oxford and Cambridge, was founded in 1865 as a technical college, and was given the rank of a university college in 1901. Exeter School, one of the most important public schools in the west of England, was founded in 1629. In 1876 it was reorganized and new buildings were erected for it; they include a chapel, gymnasium, laboratory, swimming baths, etc. The old buildings in the High Street were then abandoned, and the school is now outside the city proper. There are also training colleges for teachers.

An important rly. centre, Exeter has a floating basin and is connected with the sea by a ship canal (begun in 1564), which extends five miles and opens into the estuary near Topsham. Formerly the seat of an active woollen industry, it is now an important agricultural centre, while brewing, iron-founding, and Honiton lace and paper manufactures are carried on. Market day, Friday. One member is returned to Parliament. Pop. 59,608. The British *Caer Isc*, the Roman *Isca Damnoniorum*, and the Anglo-Saxon *Eaxancestre*, Exeter, as the principal fortified town of the W., was frequently besieged by the Danes and other invaders; it capitulated on terms to the Conqueror

in 1068, was surrendered in 1136, successfully withstood attacks in 1467, 1497, and 1549. It surrendered to the royalists in 1643,



Exeter. University College, part of the Albert Memorial

but the parliamentarians were readmitted three years later. It is the Chatteris of Thackeray's *Pendennis*. Its motto is *Semper Fidelis*.

**Exeter**, MARQUESS AND DUKE OF. English titles borne by several distinguished families. The first duke was John Holland, a half-brother of Richard II and a descendant of Edward I. The son of Thomas Holland, earl of Kent, and Joan, afterwards



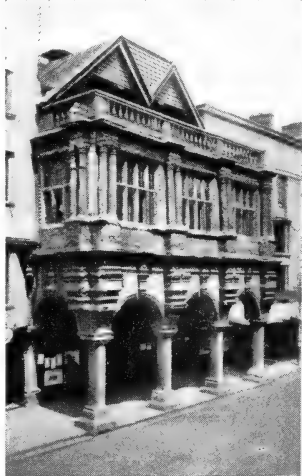
1st Earl of Exeter, English statesman  
After Janssen

the wife of the Black Prince, he was made a duke in 1397. He had already married a daughter of John of Gaunt, and had been made earl of Huntingdon. One of Richard's chief

assistants, he was condemned and executed in Jan., 1400, for conspiring against Henry IV, his titles and estates being forfeited. After Thomas Beaufort, earl of Dorset, had been duke of Exeter from 1416 to 1426, the title returned to the Holands; in 1443 John Holland, a son of the executed John, was made duke of Exeter. His son, Henry, lost his title during the Wars of the Roses.

The title of marquess of Exeter began with the Courtenays. In 1525 it was given to Henry Courtenay, earl of Devon. He was executed in Dec., 1538, his heirs being deprived of his titles. In 1605 Thomas Cecil, Lord Burghley, (*q.v.*), a son of the great Lord Burghley, was made earl of Exeter. His descendants continued to hold the title, and in 1801 Henry, the 10th earl, was made a marquess. In 1898 William Thomas (b. 1876) became the 5th marquess. The seat is Burghley House (*q.v.*), and the eldest son is known as Lord Burghley.

**Exeter Book**, THE. MS. collection of Anglo-Saxon poems in the library of Exeter cathedral, to which it was presented in the 11th



Exeter. The pillared façade of the Guildhall, added to the original building in 1593

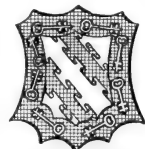
century by Bishop Leofric. It is clearly written on vellum by one scribe, and forms the most important body of Anglo-Saxon literature that has come down to us. It includes *Cynewulf's Christ*, *The Legend of S. Juliana*, a metrical life of Guthlac, *Widsith*, and *The Wonders of Creation*. It was first printed as *Codex Exoniensis* in 1842, with translations by Benjamin Thorpe. See *English Writers*, H. Morley, vol. ii, 1888.



Exeter College, Oxford. The front quadrangle, showing the fine Gothic chapel

Hills & Saunders

**Exeter College.** One of the colleges of the university of Oxford. Founded in 1314 by Walter de Stapeldon, bishop of Exeter, it was first called Stapeldon Hall, afterwards Exeter Hall, and then Exeter College, being enlarged by Sir William Petre in 1565. It has always had a special connexion with Devon and Cornwall, and certain



Exeter College arms

scholarships are confined to schools in those counties. Among famous Devonians educated here were R. D. Blackmore and Archbishop Temple. The buildings face on Turl Street and Broad Street, and their chief feature is the 19th century chapel, with decorations by Burne-Jones and William Morris, both members of the college. The hall is notable and there is a small but beautiful garden. The head is called the rector.

**Exeter Hall.** Public building in London, the site of which is now occupied by the Strand Palace Hotel. Built in 1831 on land belonging at one time to the marquess of Exeter, it was first the headquarters of the Sacred Harmonic Society, where most of the great singers of the time, including Jenny Lind, appeared. It later became known as the place where the annual meetings of many religious bodies were held. In 1880 it was acquired by the Y.M.C.A., which occupied it until 1907. The hall held 5,000 people.

**Exhaust** (Lat. *ex*, from, out; *haurire*, to draw). Word meaning in general the stream of burnt gases ejected from the engine, or it may be applied to the exhaust piping itself. In the internal combustion engine the waste gases after combustion are expelled through the exhaust valve, and the

exhaust port into the exhaust pipe at the exhaust stroke of the piston.

**Exhibition.** In education, a grant made to assist persons to pay for their education. It ranks as less important and is usually less valuable than a scholarship. There are exhibitions at most of the colleges of Oxford and Cambridge. This use of the word comes from an old meaning when exhibition meant maintenance. See Scholarship.

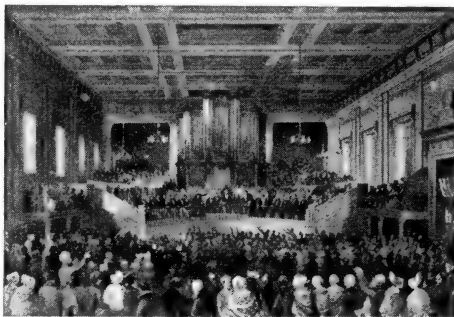
**Exhibition** (Lat. *ex*, out; *habere*, to have). Term used for a display or show of any kind. Thus there are exhibitions of pictures and other works of art. In a special sense, however, the word is used for displays of manufactured goods, and national and international exhibitions of this kind were organized on an enormous scale during the 19th and 20th centuries. These are known to the French as *expositions*. In a sense they are the modern equivalent of the great medieval fairs, although the idea is not so much to sell goods directly as to make them known.

Several exhibitions were held during the 18th century. In 1797 one was held at St. Cloud, and

Britain, Germany, and other European countries, also other parts of the British Empire and the U.S.A., borrowing the idea from France. Some of them were confined to a single industry, and to the products of the home country, but others were wider in their scope. Paris remained the centre of this form of activity, but exhibitions were held in London (1828), Manchester (1837), Leeds (1839), and Birmingham (1849).

The modern international exhibition is generally regarded as having started in 1851, when one was held in Hyde Park, London. Prompted by the Society of Arts, the Crystal Palace was built to accommodate the exhibits, and it was a great success. It was visited by over 6,000,000 people, and from the fund money was set aside for scholarships—1851 exhibitions they are called—and for other purposes. Other international exhibitions followed, one or two being held almost every year. Among the largest were New York (1853) and Paris (1855). In 1862 a second was held in London, and in 1853 and 1865 there were exhibitions in Dublin, where, on a smaller scale, triennial ones had been held since 1829. In 1867 another international exhibition, with several novel features, was held in Paris; in 1873 there was one in Vienna; in 1876 at Philadelphia; in 1878 at Paris, as before in the Champs de Mars; in 1888 at The Hague. In 1886 there were exhibitions in Edinburgh and Liverpool, and a Colonial and Indian Exhibition in London, and in 1888 one at Glasgow. In 1889 a great exhibition was held in Paris, the Eiffel Tower being erected for it. In 1893 there was one at Chicago. Glasgow had another in 1901.

The Paris Exhibition of 1900 was the largest till then held in Europe, and in 1904 the one at St. Louis again created a record for size. In 1901 a Pan-American Exhibition was held at Buffalo, and others were held at Liège (1905), Brussels (1910), Turin (1911), and Ghent (1913). In 1908 there was held at Shepherd's Bush the first of a series of exhibitions on slightly different lines. This was confined to the produce of Britain and France, and one in 1910 to those of Britain and Japan. The annual exhibitions held at Earl's Court, London, were a prominent feature of the metropolis. The Great War put a temporary stop to this form of activity, but with its cessation numerous plans for exhibitions, both general and particular, were suggested. The British Empire exhibition, arranged for



Exeter Hall. An anti-slavery meeting held in the hall in 1841

From a contemporary engraving

several were held in Paris in the time of Napoleon. The practice of awarding medals was then introduced. Others followed—Great



1923 in London, is intended to foster imperial interests, both commercial and political. Exhibitions are held by particular trades, such being the motor trades, drapery trades, etc. Other exhibitions are promoted by newspapers, a notable instance being the Ideal Home Exhibition arranged by The Daily Mail, at Olympia, in 1920, and the Efficiency Exhibition arranged for 1921.

**Exhumation** (Lat. *ex*, out of; *humus*, ground). Act of digging up and removing any object from the ground, but generally applied to the removal of a dead body from its burial place. It is a misdemeanour to do this for any purpose without legal authority. In England, such authority may be the coroner where foul play is suspected or a post-mortem examination ordered, and the ordinary (*q.v.*) of the diocese when reinterment is the reason. See Autopsy; Burial Acts.

**Exile** (Lat. *exsilium*). Removal from one's native land, either voluntarily or under compulsion. The word probably means "leaping forth," from the root *sal*-, which occurs in *con-sul* and *Salii*, the leaping priests of Mars.

In Greece, exile was chiefly a punishment in cases of homicide, but was also enforced for certain crimes and offences against the state and society. Homicides could anticipate their sentence by voluntary withdrawal, but were liable to be put to death if they returned. Exile was also a political measure employed in troublous times. It carried with it disfranchisement and confiscation of property. A peculiar method of banishment was ostracism (*q.v.*).

At Rome, exile did not become a recognized form of punishment until about the time of the Gracchi. Theoretically, a citizen's life and liberty were inviolable, so the fiction of *aquae et ignis interdictio*, exclusion from the use of fire and water, was invented, since anyone deprived of these necessities in Rome would perforce have to seek a home elsewhere, it being an offence for anyone to supply them to a person under the ban. It is uncertain whether *interdictio* involved loss of civil rights and confiscation. The sentence was at first pronounced by the *comitia centuriata* (*q.v.*), later by the *quaestiones perpetuae*, the standing courts which dealt with serious offences, such as high treason, poisoning, and arson. Everyone had the right of voluntarily leaving the city, but was forbidden to return under pain of death.

In early imperial times, *deportatio* took the place of *interdictio*. The



Exmoor. The Doone Valley, part of the romantic country in which Blackmore laid the scene of his Lorna Doone

condemned person was compelled to take up his abode for life in some place out of Italy, or on some island. He was sometimes allowed to choose the place of exile himself, but generally it was assigned to him. Deportation entailed loss of civil rights and confiscation.

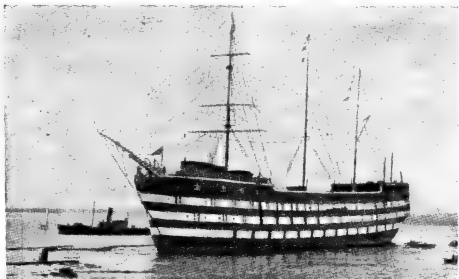
A milder form of banishment was *relegatio*, temporary or for life, pronounced by a higher magistrate or the emperor against any person whose presence in the city was considered undesirable. It entailed neither loss of civil rights nor confiscation, as is expressly stated by the poet Ovid, who was exiled by Augustus to Tomi on the Black Sea for some unknown offence. See Deportation; Outlawry; Transportation.

**Ex Libris** (Lat., from books). Label of ownership usually called in England a bookplate. Pasted inside the front cover of a book, it bears the name and device of the owner, preceded by the words *Ex Libris*. This Latin appellation is incorporated in the titles of societies devoted to the

study of bookplates. See Bookplate.

**Exmoor**. Picturesque and elevated moorland expanse in Somersetshire and Devonshire, England. Formerly a forest, its trees have largely disappeared, and three-fourths of its area is now covered with heather and a coarse grass, on which are pas-

tured ponies, sheep, and red deer, the last preserved for stag-hunting. On Feb. 22, 1917, Sir Thomas Acland granted a lease of lands covering between 7,000 and 8,000 acres to the National Trust for 500 years under an arrangement whereby he relinquished the rights to develop the property as a building estate, and granted the Trust power to preserve the estate in its present condition, retaining for himself and his successors the rents and profits and rights of an owner. The area thus placed in



Exmouth. Training ship, anchored off Grays, Essex, where boys are trained for the navy and merchant service. See page 3048

trust for the nation includes some of the finest hill, valley, and woodland scenery of Exmoor. Lorna Doone, Blackmore's romance, has made Exmoor familiar. The river

Exe takes its rise here. The highest point is Dunkery Beacon, 1,707 ft.

**Exmouth**. Urban dist., seaport, market town and watering-place of Devonshire, England. It stands at the mouth of the Exe, 10½ m. S.E. of Exeter on the L. & S.W.R. Exmouth was the first seaside resort in the county,

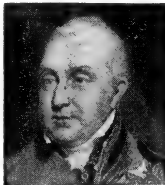


Exmouth from the east, looking along the promenade and sands towards the mouth of the Exe

and is largely resorted to by sufferers from lung complaints. Once a flourishing seaport, Exmouth contributed ten ships for the attack on Calais in 1347. The chief industries are brick-making, fishing, and the manufacture of Honiton lace. Market day, Tues. Pop. 11,962.

**Exmouth.** Training ship for the British navy and mercantile marine. Moored off Grays, Essex, boys are trained on it for the above services, and also for employment in naval and military bands. Attached to it is a sea-going tender, Exmouth II.

**Exmouth, EDWARD PELLEW, 1st Viscount (1757-1833).** British sailor. He was born at Dover, April 19, 1757, and entered the navy at the age of 13. In 1776 by his gallantry at Lake Champlain (*q.v.*) he secured his promotion to lieutenant. In 1793 he was appointed to the frigate



*Exmouth*  
After W. Owen, R.A.

*Nymphé*. For his capture of the *Cléopâtre* he was knighted in 1793, and in 1794 commanded one of the western squadrons. Baronet in 1796, and M.P. for Dunstable, 1802, in 1804 he was promoted rear-admiral and commander-in-chief in India.

Returning to England in 1809, he became commander-in-chief of the North Sea, 1810, and of the Mediterranean station, 1811. In 1814 he was raised to the peerage as Baron Exmouth of Canonteign. In 1816, on the refusal of the dey of Algiers to cease his piracies, Exmouth was sent to bombard that city, with the result that over 2,000 slaves were liberated. Made viscount in that year, he died Jan. 23, 1833. The title is still held by his descendants, Edward (b. 1890) having become the 5th viscount in 1899.

**Exmouth Gulf.** Inlet of the W. coast of Australia. It penetrates inland about 65 m., and at its entrance is 30 m. across. It is sheltered from the Indian Ocean by a peninsula 80 m. in length, which terminates in the North West Cape.

**Exodus.** The second book of the Pentateuch, or rather Hexateuch. The title, taken from the Septuagint (Ex. xix, 1), means the "Going-forth." The Hebrew title is "Names" or "And these are the Names." The book falls into two main divisions: (a) history of

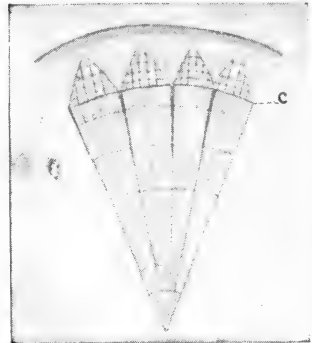
Israel in Egypt, Ex. 1-18; (b) account of Moses' administration at Sinai, whither he had led the children of Israel, Ex. 19-40. The former section incorporates a much earlier composition, the Song of the Red Sea (Ex. 15). The latter includes one of the three chief Hebrew codes of law (Ex. xx, 22-xxiii, 19), described by scholars as the Book of the Covenant. See Hexateuch.

**Exogamy** (Gr. *exō*, outside; *gamos*, marriage). Primitive institution binding a man to marry outside his own social group. Its primal impulse was probably economic rather than eugenic. In those societies wherein the family is overshadowed by the kinship group, the exogamous clan is often associated with a totem, a mystical token of kinship. Highly developed with the Australian aborigines, it is usual among the N. Mongols, and widespread with the American Indians. Arising from it are such marriage customs as marriage by capture. A special form called hypergamy exists in some Hindu castes; it requires a woman to marry into a caste higher than her own. See Marriage; Society.

**Exogens** (Gr. *exō*, outside; *stem*, *gen*, to be born). Name for the great division of plants now generally known as dicotyledons. It indicates that the annual increase of girth is due to the addition of a ring of new wood between the old wood and the bark. See Botany.

**Exophagy** (Gr. *exō*, outside; *phagein*, to eat). The practice among some cannibal peoples of seeking their human food outside their own kin, totem or tribe. The contrary usage is endophagy. The words are loosely employed by different writers; endocannibalism and exocannibalism might usefully be reserved for the man-eating of totemic tribes, exophagy for extra-tribal cannibalism (*q.v.*).

**Exophthalmic Goitre, GRAVE'S OR BASEDOW'S DISEASE.** Condition associated with increase in the size of the thyroid gland, the organ situated in front of the lower part of the neck. It may be due to excessive secretion from that gland (hyperthyroidism), or may result primarily from an affection of the nervous system. Strong emotions, such as fright, grief, or worry, are antecedent factors in some cases. The disease is more common in women than men, and generally begins between the age of 20 and 30. Usually the first symptom is severe palpitation of the heart and throbbing of the large blood-vessels in the neck. The enlargement of the thyroid may affect the whole gland or only one lobe



Exogens. Diagram in transverse section of an exogenous shoot. C shows the point where the growth takes place

*Exophthalmos*, or protrusion of the eyeballs, is a prominent feature. A fine tremor of the muscles of the lower and upper limbs is sometimes an early symptom.

Occasionally the disease runs an acute course, and death occurs in a few months. More frequently the condition becomes chronic, and extends over years with periods of improvement and exacerbation. A certain number of cases recover, but rarely completely when the symptoms are well marked. Death may result from disturbance of the heart, tuberculosis, or exhaustion. Treatment consists in giving absolute rest in bed, followed by a quiet country life. Iron and strychnine have proved useful, and application of the galvanic current may be tried. Serum therapy has given inconsistent results.

**Exorcism** (Gr. *ex*, out; *horkizein*, to adjure). The expulsion of malign spirits by ritual means. Belief in demon-possession and demon-obsession is revealed in early Sumerian inscriptions. The Semitic Babylonians regarded most mental and bodily ailments as due to intrusive demons, whose expulsion was sought by the incantation of charms containing a divine name, fortified by material aids. Exorcism passed into the Greco-Roman world, was rife in W. Asia in N.T. times, was taken over by early Christianity, and survives here and there in ecclesiastical ritual. Baptismal exorcism is retained by the Roman and Old Lutheran communions.

In primitive culture disease is commonly attributed to evil magic wrought by one person upon another. The intrusive evils, whether human hosts or non-human demons, may haunt persons or places. Preventive exorcism is one chief purpose of the amulet. Expulsion may be attempted by sympathetic magic,

such as the Babylonian wasting of a wax effigy of the sorcerer, or the Dakota shooting of a bark effigy of the demon.

Ills may be driven out by drums, as in Patagonia, or other musical means, as in the case of David and Saul; they may be transferred to scape-animals, such as fowls, as in W. Africa; to goats, as in Arabia; or to swine (Matt. 8). They may be enclosed in a receptacle left by the roadside, or thrown into the stream, as in Uganda; conjured into a proa, driven out to sea, as in the Malay archipelago; or attached to a rag or wisp of hair suspended from a tree. An appeal or command addressed to the demon may be fortified by a promised sacrifice or a vow. See Demonology; consult also The Devils and Evil Spirits of Babylonia, R. C. Thompson, 1903-4; The Golden Bough, pt. i, J. G. Frazer, 3rd ed. 1911.

**Exostosis** (Gr. *ex*, out; *osteon*, bone). Abnormal outgrowth of bone. See Bone.

**Expansion** (Lat. *ex*, from, out; *pendere*, to spread). If the temperature of most bodies is raised the body expands. The amount by which solids expand when heated through any reasonable degree of temperature is very small. A bar of iron one metre in length only extends a little more than a thousandth of its length when heated from 0° C. to 100° C. The coefficients of expansion of a number of metals have been experimentally determined by very refined methods. For each degree Centigrade the following are the coefficients of expansion of some materials:

Platinum	=	0.00000899
Copper	=	0.00001678
Zinc	=	0.00002918
Glass	=	0.0000083

The expansion, both apparent and absolute, of some liquids can also be determined. The mean value for the coefficient of cubical expansion of mercury between 0° C. and 100° C. is 0.0001819. Water does not expand normally because, at ordinary pressures, water has a maximum density at a temperature of 4° C., and if it is cooled below this it expands and decreases in density. Gases expand with heat at all temperatures, but pressure changes their coefficients of expansion. At ordinary atmospheric pressure, the coefficient of expansion of air is 0.003671, of hydrogen, 0.00366; in both cases practically  $\frac{1}{273}$ . See Heat; Temperature.

**Ex parte** (Lat., from one side). Expression used in English law to signify something done or said by one person not in the presence of his opponent. Thus an *ex parte* ap-

plication is one made in the absence of the other side. An *ex parte* statement is one made when no one is present to contradict it.

**Expectant.** Term used in English law. An expectant estate is one that comes into possession and enjoyment when some date arrives or event happens. Reversions and remainders are the only expectant estates known to common law; but when wills of land were allowed the law permitted executory interests. An expectant heir is one who is bound to come into property on the death of another.

**Expectation.** State of expecting something. In the plural it is used for the money which one should receive under a will. If this is a certainty, i.e. if the will is that of a person already dead, money can be borrowed on this anticipation. The Sunday after Ascension Day is sometimes called Expectation Sunday, because the apostles were then expecting the Lord.

**Expectation of Life.** Term used by actuaries and others engaged in life insurance business for the number of years a person may be expected to live. By careful calculations from a large number of cases tables have been worked out which are used when annuities are bought and sold. The expectation differs for males and females, and for different ages, but a roughly accurate method is to value the expectation of life at two-thirds of the difference between the present age and 80. Thus a man of 41 may count upon living to 67, this being 26 more years, two-thirds of 39, which is the difference between 41 and 80. Some writers have objected to the term, and equation of life has been suggested as a substitute. See Annuity; Death-Rate; Insurance.

**Expectorant** (Lat. *ex*, out; stem, *pector-*, breast). Drug which assists the expulsion of mucus from the lungs and air passages. Those most frequently employed are ammonium carbonate, senega, squills, ipecacuanha, benzoin, and balsam of tolu.

**Expectoration.** Term applied to the act of spitting, and to the material ejected. By expectoration medical men usually mean material coughed up from the lungs, not merely saliva. In health there should be practically no expectoration; in diseases of the lungs or air passages the secretion may contain blood, pus, and bacteria.

**Expeditary Force.** Name given in the British army organization to the force of regulars trained and ready for operations abroad. As planned in the re-

organization of the army, 1907, and developed in the next few years, it was to consist of six divisions of infantry, each composed of 598 officers and 18,077 men, with 54 field guns, 18 4.5-in. howitzers, and 4 heavy 60-pounder guns, and one division of cavalry, composed of 485 officers and 9,412 men with 24 horse-artillery guns. In addition, troops were provided for the line of communications. The total strength available for the firing line was thus about 130,000 officers and men, with 480 guns. Each infantry division included the usual divisional troops, engineers, medical unit, etc. The cavalry division had four brigades.

The actual British Expeditionary Force that reached France in Aug., 1914, had a combatant strength of about 60,000 men—four divisions, and one cavalry division. The other two divisions did not reach the front till the middle of Sept. The original force, divided into two corps under Haig and Smith-Dorrien, and the whole, commanded by French, took its place on the front in Belgium, Aug. 23. See Army, British; Great War; Mons; consult also 1914, Field-Marshal Viscount French, 1919.

**Expenditure** (Lat. *ex*, out; *pendere*, to weigh). Act of paying out money. In large firms expenditure passes through the counting-house and is checked by the auditors. National expenditure is voted by the House of Commons, and the expenditure of local authorities, which is under the control of finance committees and officials acting under their orders, is checked by auditors of the ministry of health. See Accountancy; National Finance.

**Experience** (Lat. *experiri*, to try). Generally speaking, any sense-perception; in a narrower sense, a systematic organization of perceptions. The knowledge derived from experience, which alone provides communication with the objective world outside, is closely connected with the mental activity which comprehends and shapes experiences. Kant, while admitting that all true knowledge is derived from experience, held experience itself to be the result of the application of *a priori* forms to phenomena. One defect of experience is that, owing to different impressions being produced upon different persons by the same things, it receives a personal, individual tone, and fails to be completely general. Again, it lacks absolute certainty and necessity, since it does not acquaint us with the foundation of our knowledge. See Psychology.

**Experiment.** Testing a provisionally adopted theory by facts. The great progress of natural science in modern times has been chiefly due to the systematic employment of experiment. Ancient philosophers and inquirers had a contempt for this method, which first received due recognition by Francis Bacon in his *Novum Organum*, 1620. An experiment may be defined as an observation which can be repeated, varied, and explained.

**Experimental Farm.** Farm at which science is applied to the processes of agriculture, and the results tabulated for reference and publication. The best known and oldest of English experimental farms is that founded by Sir John Lawes at Rothamsted in 1843. He succeeded to the estate in 1834, and from the first carried out certain experiments; but it was not until 1843 that he obtained the assistance of Dr. Gilbert, and began his famous systematic experiments. Since that pioneer work, the great agricultural societies started other stations such as that at Woburn, and of Pumphorston in Scotland. The oldest French station was founded by Boussingault at Bechelbronn in Alsace. Most governments have established similar agricultural research institutions, among them being several in Canada. See Agriculture; Crops; Farm.

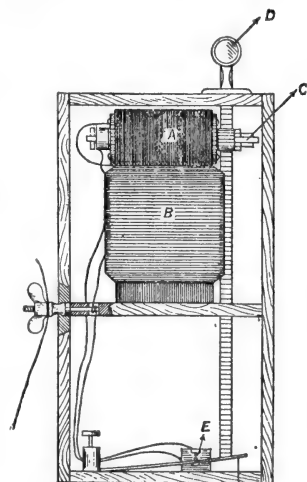
**Expert** (Lat. *expertus*, tried). Term used by English lawyers to describe one who has special skill in and knowledge of a trade or profession. A surgeon, an architect, a builder, a chemist, for example, are experts in surgery, building, and chemistry. Experts are often called to give their opinions in technical cases.

**Exploser.** Term designating (a) the priming employed in high-explosive shell, and (b) the electric machine for firing blasting charges fitted with electric detonators.

(a) The high-explosive charge employed in a shell is always in a very dense condition in order to reduce its sensitivity, utilise the greatest possible weight in the limited space, and prevent movement owing to the shock of discharge when the projectile is fired. High explosives in a dense condition cannot readily be detonated by fulminate of mercury or other initiators, and in order to build up sufficient violence it is necessary to interpose a quantity of loose or lightly compressed high explosive between the detonator in the fuze and the bursting charge. This priming may be confined in a gaine (*q.v.*), or

placed in a bag, or merely loosely stemmed into a cylindrical cavity in the bursting charge just below the fuze, and is termed the exploder. The high explosive employed in exploders is usually trinitrotoluene, tetryl, picric acid or picric powder. See Ammunition; Explosives; Shell.

(b) Exploders for firing blasting charges occasionally utilise current from a set of accumulators passed through an induction coil, but the more usual machines are of the magneto type, a sectional illustration of such a machine being shown. It consists essentially of a double-wound armature, A, which can be rotated between the poles of the horseshoe magnet, B, through the free wheel pinion, C, which is actuated by the rack, having a hand grip, D, at its upper end. The free wheel ensures that the armature does not rotate as the handle is pulled up, but only when it is pushed down and the current is normally short-circuited by the switch, E. When the rack reaches the bottom of its stroke, and the armature is revolving at maximum speed, the rack opens switch, E,



Exploser. Sectional diagram of magneto exploder. For explanation see text

and the whole of the current passes to the main leads secured by the wing-nuts shown on the left, and thus to the detonators. A machine of this type weighs some 16 lb., and is capable of simultaneously firing up to 100 charges if desired.

**Exploitation** (old Fr. *exploit*, profit). Stage in the life of a mine when ore is extracted and sold. The previous stages being prospecting and development. During the earlier periods the money expended

is regarded as capital invested in the business; during exploitation the revenue from sales is regarded partly as return of the capital expended and the interest thereon. See Mining; Prospecting.

**Exploits.** River of Newfoundland. The longest river in the island, it rises in the hills of Long Range and flows right across in a N.E. direction. It passes through a well-wooded district which supplies timber for the pulp mills, and on it is the town of Grand Falls. It empties itself into the Bay of Exploits, having drained about 4,000 sq. m. Its length is about 160 m., and it is navigable by steamers for 12 m.

**Exploration** (Lat. *explorare*, to search out). Literally, any kind of discovery, but the word is applied specially to discovering and making known the hitherto unknown parts of the world. There was little in the way of exploration from the time of the Greeks to almost the end of the Middle Ages.

In the 13th century something became known about China, and Marco Polo may fairly be ranked as a pioneer of exploration. It was, however, towards the end of the 15th century that the great discoveries were made that gave a remarkable impetus to the work of the explorer. In 1492 Columbus reached the W. Indies; in 1497 Vasco da Gama rounded the Cape of Good Hope, and reached India; while about those years notable voyages were undertaken by Bartholomew Diaz, the Cabots, and others. Newfoundland was discovered; Cabral reached Brazil; Balboa saw the Pacific. From these discoveries followed the exploration of America. In the N. the lead was taken by Frenchmen, La Salle being one of their greatest names, and in the S. by the Spaniards and Portuguese. Gradually the nature and extent of the two continents were made known; the Amazon and the Mississippi were discovered and then explored, while the secrets of the wonderful Aztec civilization were revealed.

In the 18th century Australia was discovered by Captain Cook, although the Dutch Tasman had some time before found Tasmania and New Zealand. Early in the 19th century the continent was explored by Oxley, Sturt, Eyre, and a host of others. More and more was becoming known of Asia, although it was long before its central area was explored by Hedin and others, the final stage being the entry into Lhasa, 1904. In the 19th century, too, came the exploration of Africa, the work of

Livingstone, Stanley, Hanning, Speke, and others among Englishmen, and of a number of Frenchmen and Germans. The secrets of the Nile and the Congo were revealed, and soon there was little for the explorer to do.

From the time of the discovery of America, explorers had turned their attention to a north-west or north-east passage, and from this came the desire to reach the north pole. The south pole, too, was aimed at, and the exploration of the world's surface may be said to have ended when these goals were reached. See Africa; Antarctic Exploration; Arctic Exploration; Australia.

**Explosion** (Lat. *ex*, from, out; *plaudere*, to clap). Accidental ignition of gas. Explosions in coal mines are due to the fact that coal deposits are liable to give off certain gases which, when mixed with air in certain proportions, form explosive compounds which only require a spark or flash to fire them with possibly disastrous consequences to the workers, as at Courrières in France in 1906, when 1,100 lives were lost. Not all coal mines are equally liable to have explosions; many, indeed, are so entirely free from fire-damp that naked lights are used by the miners in all parts of the workings, while electricity is freely employed both for lighting and for power purposes. In others the danger is always present, and the most exacting precautions are necessary to avoid a disaster.

It is, indeed, contended by many authorities that no coal mine can be absolutely safe, as dust alone without any admixture with methane or fire-damp may give rise to an explosion. The flame from a blown-out shot, that is from an explosive cartridge which has not expended its force upon the coal in which it has been embedded, but has blown out the tamping by which it was shut in, may be 20 ft. in length and even 35 ft. in narrow galleries, and may travel 80 ft. or more along the workings if dust be present in the air; consequently a real danger may exist even in mines which are not "fiery."

Apart from blown-out shots, which are regular occurrences, an explosion may be caused by any kind of spark or flame or any ignited substance—a blown electric fuse, a broken electric lamp, for example, where electricity is employed; or an overheated safety lamp. It is a remarkable circumstance that mine explosions began to be more frequent as the ventilation of the workings was improved, a circumstance which led to an important inquiry as to the relations

between explosive gas and the oxygen in the atmosphere of the workings. Legislation in this country requires that the oxygen in the air of the workings shall not be below 19 p.c. and that the carbonic acid gas shall not exceed a definite very low proportion, but inquiry has shown that an explosion would be almost impossible if the proportion of oxygen were reduced to 17 p.c.

Thus the measures taken on the one hand to improve the working conditions of the miners would appear only to increase his risk in another direction. Other precautions recommended to prevent an explosion comprise watering the dust of the floor at the working face before firing a shot; removing the dust from the intake haulage ways by reversing the air current from time to time; watering the floor, sides, and roof of the roadways, and rendering the coal-dust unignitable by mixing it or covering it with

stone-dust, which may be made by grinding waste shale. The use of safety-lamps (*q.v.*) is made imperative and certain classes of explosives prohibited by legislation in all dangerous mines; while arrangements now exist for giving all coal mining regions warnings of any approaching atmospheric changes which may be calculated to favour the escape of gas in the workings and thus increase the normal risks.

Where risk of explosion is the normal condition of a mine, special preparations are now made at the most modern works for the prompt release of miners who happen to be below at the time of the explosion. These men may escape with their lives from the explosion itself only to fall victims to the after-damp or choke-damp, unless they can be promptly got out, and as a rule their ways of escape will be blocked by destroyed or damaged workings. See Coal-dust; Fire-damp.

## EXPLOSIVES: IN PEACE AND WAR

Capt. E. de W. S. Colver, Author of *High Explosives*

*In addition to the following introductory sketch this work contains shorter articles on all the leading explosives, e.g. Dynamite; Gunpowder, etc. See also Ammunition; Artillery; Gas, etc.*

Explosives (Lat. *explosus*, driven out) are solid or liquid substances or mixtures which are capable, when suitably initiated, of being converted in a very small interval of time into other more stable substances which are wholly or chiefly gaseous.

Contrary to popular belief, the energy content of explosives is comparatively low, as shown by the relative heat (energy) content of the following: petroleum, 15; coal, 10; wood, 5; nitroglycerine, 2. The tremendous explosive effect is solely due to their capability of releasing the whole of their energy in a minute interval of time.

The early history of explosives and their actual invention is a matter of much speculation. Gunpowder is certainly the oldest variety, and whilst many writers confer on it great antiquity and connect it with "Greek fire," it is doubtful whether saltpetre of sufficient purity was known at the time. Saltpetre was known to the Chinese and Arabic people about 1200, and they used it in fire-works for military purposes. Roger Bacon's writings contain undoubted references to gunpowder, instructions for its manufacture being concealed by cyphers, and he was well acquainted with the fact that it explodes violently when ignited in confinement. No real development of gunpowder occurred until it was used for the propulsion of missiles from guns, and this invention appears to be due to a German

monk, Berthold Schwartz. Old manuscripts record different dates for the discovery, but guns were certainly in use by 1320.

For some six centuries gunpowder remained the only explosive known to man, and its composition remained almost unchanged, saltpetre, charcoal, and sulphur being the ingredients, in varied proportions. Its progress from an uncertain, irregular medium to a uniform and reliable explosive has been entirely due to improved manufacturing methods and greater purity of ingredients, this tending to more intimate contact of the components and consequently to faster and more regular burning. A mechanical mixture of oxidiser and combustible can never exceed a certain degree of intimacy of contact, so the rate of burning or violence of explosives was limited whilst gunpowder remained the only type.

Marked progress was made after 1846, when both nitrocellulose and nitroglycerine were discovered, the former simultaneously by two Germans, Schönbein and Böttcher, and the latter by an Italian, Sobrero. Both proved to be extremely violent explosives, incomparably more powerful than gunpowder. The reason for this is that both are chemical compounds, the oxidiser and combustible being combined in the same molecule, and hence in the closest possible contact. They are types of a



distinct class of explosives, termed the nitric esters, in which the hydroxyl groups (OH) of the raw material are more or less completely replaced by nitrate groups (ONO<sub>2</sub>) during nitration.

The molecular arrangement of the product is such that the carbon atoms are linked to the ONO<sub>2</sub> groups by hydrogen. The oxygen has the greatest affinity for carbon and hydrogen, but is bound to the nitrogen, resulting in the substances being in an unstable state, and when they are suitably initiated, re-grouping occurs in accordance with the chemical affinities and with the production of heat.

Attempts to utilise these new substances commercially showed a number of unexpected difficulties. Many disastrous explosions occurred during storage and handling, and, although a spark or flame had been the accepted method of firing gunpowder, these were quite inadequate for the new explosives, which were easily exploded by percussion. Credit for solving the ignition problem rests with a Swedish chemist, Alfred Nobel, who, in 1864, after years of patient research, evolved a tube containing mercury fulminate which, when exploded by a spark, initiated complete detonation in nitroglycerine.

#### Invention of Dynamite

Fulminate of mercury had previously only been used in percussion caps for firing guns, and Nobel's application of it to the initiation of explosives is one of the greatest advances in explosives science, and alone has rendered possible the use of most of our modern high explosives.

In commenting on the early difficulties with nitroglycerine and nitrocellulose, reference was made to two very important properties of explosives—stability and sensitivity. Stability is the ability of a substance to remain unchanged during prolonged storage, and early explosives were deficient in this respect. Nitric esters slowly decompose if minute traces of the nitrating acid remain in the product, sufficient heat being eventually generated to explode the mass, and some compounds which would be successful explosives are, inherently, so unstable that they cannot be used. In the case of explosives, sensitivity is always comparative, and is employed to express the ease with which the compound may be exploded by such agencies as heat, friction, percussion, etc. Many compounds are known which cannot be used as explosives owing to being excessively or insufficiently sensitive. It is a popular but fallacious belief

that a successful explosive is sensitive and detonates as soon as disturbed, whereas the *desideratum* is one that is so insensitive as to be unaffected by rough usage, but which detonates with great power or violence when suitably initiated.

Many years of patient work were required to make nitroglycerine and nitrocellulose of commercial value. The former was so sensitive to percussion that soon Nobel was the only worker who persevered with it. He suffered grave family casualties, and accidents were so numerous that many countries prohibited the transport of the substance, but in 1867 he was rewarded by the discovery that kieselguhr would absorb about three times its weight of nitroglycerine, yielding a plastic mass of sufficient insensitivity. This was christened dynamite and its rapid adoption founded Nobel's fortune. Progress in the use of nitrocellulose was equally slow, and attended by numerous accidents, much work being done by von Lenk and later by Abel. Improvements in manufacture increased its stability, and in 1868 gun cotton was made a successful military blasting explosive. Neither of the new explosives, however, was capable of use in guns, being too violent in their action, whilst they were too sensitive for employment as shell fillings.

In 1867 mixtures of ammonium nitrate with various combustibles were introduced as explosives, but were too insensitive for use until nitroglycerine was added, when they found a certain amount of favour. Another class of explosive was invented by Sprengel in 1871, when he employed mixtures of nitric acid with organic combustibles, the essential feature being that the ingredients were non-explosive until mixed together for use. These have been extensively used for blasting.

#### High Explosives for Shells

Sprengel also experimented with picric acid or trinitrophenol in 1871, but he was not encouraged by the British Government, and this explosive was not taken up until 1885, when Turpin proposed its use for shell filling, and France adopted it. This was the first high explosive which was sufficiently insensitive for this purpose, and belongs to a new class—the nitro derivatives of aromatic hydrocarbons. These also are chemical compounds, but, during nitration, hydrogen atoms are displaced by nitril groups (ONO), which are consequently joined direct to the carbon atoms, and the products are more stable and less sensitive than the nitric

esters. Aromatic hydrocarbons occur chiefly in coal tar and petroleum, which are the raw materials for this class of explosives.

Smokeless powder became a successful sporting propellant in 1865, and a military one in 1884. The successful use of nitrocellulose for this purpose became possible when its structure was destroyed by gelatinisation, its decomposition being then more of the nature of extremely rapid combustion than explosion.

Picric acid did not prove an ideal explosive for shell filling, as it was liable to form picrates which are sensitive, and in itself proved somewhat too sensitive for use in large guns. Nitration of other aromatic hydrocarbons was therefore essayed, but did not become a commercial success until the manufacture of cheap, highly concentrated sulphuric acid was a commercial possibility. Trinitrotoluene then sprang into prominence, and was shortly adopted by Germany for military purposes, most other powers following, with the exception of Great Britain and France.

#### Explosion and Combustion

Chlorates became cheap in 1889, and as they contain much available oxygen, attempts were made to employ them in explosive mixtures. Early attempts to use them in gunpowder had proved disastrous owing to their sensitivity to percussion and friction, and to avoid such trouble some use was made of porous cartridges of potassium chlorate, which were dipped into a liquid combustible just before use.

The invention of cheddite (*q.v.*) was, however, the first completely successful application of chlorates. Ammonium and potassium perchlorates have also been employed. They contain more available oxygen, and are less sensitive than the chlorates, the ammonium salt being the more advantageous as all the products of explosion are gaseous, but for use underground it possesses the disadvantage that the products of explosion contain hydrochloric acid gas, which is poisonous, and if the explosive is to be so used it must contain some metallic or alkaline ingredient to fix this gas.

The power of an explosive can be increased by raising the temperature of the gases evolved, and this effect may be obtained by including a combustible having a high temperature of combustion, and metals are generally employed for this purpose, such explosives being designated Thermit explosives.

Dynamite, gelatine dynamite, and blasting gelatine are generally used where great shattering effect is required, and gunpowder is still employed for rendering. Military requirements generally demand a most brilliant effect from shell fillings, and here nitro-aromatic compounds alone are most used, trinitrotoluene being pre-eminent; but during the Great War shortage of supplies rendered it necessary to employ ammonium nitrate explosives for this purpose, and amatol and schneiderite are examples of successful practice. Smokeless powders all have nitrocellulose as a basis, and some contain nitroglycerine in addition—(see Cordite, Poudre B., Ballistite, E.C. Powder, Schultze Powder, etc.)—propellants for rifled weapons being required to burn much more slowly than for smooth bores.

Combustion, explosion, and detonation are terms designating the same chemical change, the sole variant being the speed with which reaction occurs, detonation being so rapid that an explosive wave apparently propagates the change instantaneously through the whole mass, whereas in combustion and explosion the reaction proceeds by layers through each particle.

#### Use in Mining

In mining, explosives are used to supplement the work of the miner's pick in breaking down the rock which it is desired to remove. The explosives in common use comprise: gunpowder; cheddites, which are chlorate preparations; dynamite, blasting gelatine, gelignite, Ardeer powder, britonite, cambrite, arkite, carbonite, kolax and duxite, which are preparations of nitroglycerine; ammonite, bellite, Faversham powder and roburite, which are preparations of ammonium nitrate, and fulminate of mercury, which is used for detonators. Gunpowder is still largely used, especially for the softer rocks, on account of its cheapness and general security. The dynamites, blasting gelatine, and gelignite are most used for hard rocks where an intense shattering effect is desired.

For use in coal mines, particularly those where there is a risk of a gas or coal-dust explosion, safety explosives are employed, these usually having an ammonium nitrate base, sensitised with either nitroglycerine or an aromatic nitro-compound. Explosives of a similar type, but of a more brilliant nature, including some of the cheddites, ammonals, etc., are used in mining and quarrying. For military demolitions guncotton or trinitrotoluene is usually employed, but

dynamite or blasting gelatine may be used in an emergency. For land mines the British army used ammonal extensively during the Great War. See *illus.* p. 2346.

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**Explosives Law.** A new Act concerning explosives was passed in England in 1860, and amended in 1861 and 1862, repealing all previous Acts. In 1875 a new Explosives Act was passed dealing comprehensively with the whole question. This was based on the report of the House of Commons Committee appointed to enquire into the terrible explosion on the Regent's Canal in 1874, and still governs the whole question. Part I deals with gunpowder, which may only be manufactured in licensed factories and kept in licensed magazines under specified conditions. Part II deals similarly with nitroglycerine, and other high explosives; Part III with inspection, accidents, search, etc., and Part IV gives supplementary provisions. The Act is administered by the home office, which publishes annual reports of its inspectors, and is responsible for new regulations, etc. The term explosive may include any substance deemed to be specially dangerous, and the Act provides for the composition, quality, character, and classification of any explosive to be defined by an Order in Council. Owing to many of the newer explosives being of a poisonous nature, regulations can also be made to safeguard the health of workers. Most other countries have introduced similar legislation. The Merchant Shipping Act of 1894 regulates the carrying of explosives in British vessels.

**Exponent** (Lat. *ex*, from, out; *ponere*, to place). Symbol of an algebraic expression denoting the number of times the expression is to be multiplied by itself. Thus in the expression  $a^3$ , the figure 3 is the exponent of  $a$ , and the expression is equivalent to  $a$  times  $a$  times  $a$ .

**Exponential.** A term used in mathematics. The exponential function is the inverse of the loga-

rithm: thus if  $y = \log x$ , then  $x$  is said to be the exponential of  $y$ . See *Logarithms*.

**Exports** (Lat. *exportare*, to carry out). Name given to goods sent out of a country. These are valued at the custom houses, or by other authorities, and all civilized countries issue periodical returns showing their value. In the United Kingdom this is done monthly by the board of trade. They are divided into four main classes: food, drink and tobacco; raw materials; manufactured articles; miscellaneous. The total value of a year's exports from the United Kingdom rose from £354,400,000 in 1900 to £962,694,911 in 1919, but this great increase was largely due to an advance in prices, not to an advance in volume.

The difference between a country's exports and its imports is known as its balance of trade, but to strike an accurate balance certain considerations should be remembered. For instance, exports are valued at their price when put on board ship, whereas in the price of imports the cost of carriage is included. Invisible exports is the name given to charges for freights and the like. These are paid to the country owning the carrying ships and play a part in the balance of trade, but are not included in the monthly figures. See *Balance of Trade*; *Trade*.

**Exposition** (Lat. *exponere*, to set forth). In music, the placing out or setting forth of the themes and materials upon which a piece is constructed. In fugue the exposition includes the first entries of all the voices or parts. In sonata form it includes the first presentation of the chief themes, before their development or elaboration is entered upon. See *Fugue*; *Sonata*.

**Express.** Literally to press out, a word used in several senses, all, however, conveying the idea of speed. It is given to a fast train and to a newspaper. See *Railways*.

**Expression, FACIAL.** Outward indication on the features of the inward character or emotions. Sir Charles Bell first put the matter on a scientific basis in his essay on the *Anatomy of Expression in Painting*, 1806. Continental writers followed, but the great classic work on the subject is Charles Darwin's *Expression of the Emotions in Man and Animals*, 1872, in which are set forth the physiological reasons for the variety of expression of which the human face, and in a lesser degree the faces of animals, are capable.

Darwin maintains that some human expressions, such as the bristling of the hair under the influence

of extreme terror, or the uncovering of the teeth under that of furious rage, can only be understood on the assumption that man once existed in a much lower and animal-like condition. He thinks the movement of the same facial muscles during laughter by man and by various monkeys indicates descent from a common ancestor. *See* *illus.* p. 59.

**Express Service.** Organization for the rapid transit of small parcels. Companies for this purpose are especially numerous in the U.S.A. and Canada, where they undertake the carrying of money and valuables, as well as of ordinary goods. They insure these, and if required collect the money on delivery. Express companies are controlled by the government as to charges, etc., much as railway companies in Great Britain.

In the U.S.A. the first express company was organized in 1836. Others followed, and soon the whole country had an efficient service, each company with its own coaches and riders. Among the largest were the Adams, the American, the United States and the Wells, Fargo. Soon they made agreements with the railway companies, by which most of their loads are now carried. In 1912 their prosperity was gravely affected by a law permitting the post office to carry heavier parcels than had hitherto been the case.

In Canada there are four large companies, in addition to those of the U.S.A., which work the country. The four have a capital of £1,000,000, and in 1916 the turnover of the whole, those of the U.S.A. included, amounted to £11,000,000. The four are Canadian, Canadian Northern, Dominion, and British America.

**Extension.** Term used in engineering for the stretching of materials under strain. All materials stretch under a pull, though the amount may be relatively very small. A bar of wrought iron, for example, one inch square will only stretch one twelve-thousandth of an inch with a pull of a ton on it. Heat is an important cause of extension of metals, and due allowance for that extension is made in all engineering construction. In railway engineering, for example, a space is left between each set of railway lines to allow of the expansion due to the heat of summer. If this were not allowed for, the rails would become twisted completely out of shape. *See* *Engineering*.

**Extensometer.** Instrument for measuring the stretch or small deformation of materials under various kinds of stresses. The use and design of extensometers have

become of increasing importance in the modern engineering with the increasing refinements in the use of metals and other materials. The stretch and deformation of materials under certain conditions must be allowed for, as for example in railway construction, bridge building, etc. Modern extensometers will measure to less than the millionth part of an inch. *See* *Materials*, *Strength of*; *Testing*.

**Extent.** English writ of execution to recover crown debts. Under writ called an extent in aid, a crown debtor can, on making an oath that otherwise the debt will be lost, obtain an order to seize the lands and goods of a debtor to himself, so that he may be able to pay what he owes to the crown. *See* *Crown Debts*.

**Extenuating Circumstances.** Term used in English law. A jury may add a rider to a verdict of guilty that there were extenuating circumstances in favour of the prisoner. The judge may take this into account in the sentence, except in cases of murder and high treason, when he is bound to pass the capital sentence. In France, "Guilty with extenuating circumstances" is a different verdict from guilty; and the sentence is different.

**Extortion** (Lat. *ex*, out; and *torquere*, to twist). In English law, a demand by an official, or someone else performing a public service, of money in excess of the amount due, or of money not yet due. It is applied by an extension to the act of obtaining money by means of threats, the offence known as blackmail. Extortion in the strict sense is punishable by fine and imprisonment, a number of statutes having forbidden it. Other forms may become robbery and be punished as such.

**Extract** (Lat. *extractus*, drawn out). Term applied, in chemistry and pharmacology, to products obtained by treating any substance with solvents and then evaporating the latter. In a more restricted sense, an extract is a concentrated form of a vegetable drug. It contains the active part of the drug, the inert portion, consisting of woody fibre, being exhausted of its active principles during the process of extraction.

The various operations involved in extraction have received special names. Infusion is the process of allowing a drug to remain in contact with hot or cold water for definite periods of time; if the solvent is boiled during the period the process is decoction. In another common method, known as percolation, the comminuted

drug is placed in a conical vessel and the solvent slowly passed through it. To reduce the liquid to a more concentrated form it is evaporated by heat. The extracts prepared in pharmacy are either thick liquids or soft pastes. The pastes are used as ingredients in making pills and lozenges.

**Extradition** (Lat. *ex*, out; *traditio*, handing over). Term used in law for the surrender, by one state to another, of fugitive criminals. As between the states, this depends on treaty; no state has an inherent right, apart from express agreement, to claim extraditory rights from another. Treaties for extradition now exist between most civilized states, but political criminals are invariably exempted from their operation. The manner in which extradition is applied for and granted depends upon the law of the country where the fugitive is. In England it is governed by the Extradition Acts, 1870, 1873, 1895, and 1906, and the Fugitive Offenders Act, 1881. The last-named statute applies to the Colonies.

By these Acts, a fugitive offender is not to be surrendered unless the foreign state concerned undertakes to try him only on the charge on which he is extradited. The fugitive is to be brought before a magistrate, who must be satisfied that the alleged offence is not political, and is one of the crimes for which extradition can be claimed. These offences range from murder to bribery. If the magistrate decides that the case is made out, he commits the offender to prison, and then a secretary of state makes an order for the gaoler to hand the offender over to the representative of the foreign state. *See* *International Law*.

**Extraterritoriality.** Term used in international law. It describes the status of a person who, when in foreign territory, is immune from the jurisdiction of local laws and courts. Sovereigns and diplomatic agents are considered such persons by ancient usage. If a sovereign is abroad, his house is extraterritorial; and the official residence of an ambassador is, by courtesy, part of the country which he represents. Hence no arrest can be made there under a local warrant; nor is the house assessable to rates and taxes. Sometimes by treaty all the subjects of one state residing in another are made extraterritorial for purposes of justice. A ship of war in a foreign harbour, behaving peacefully, remains a part of the country whose flag she flies; and a military force in a foreign country is not subject to

the laws of that country except by agreement, e.g. the British army in France during the Great War was subject to English, not to French, military law. See International Law.

**Extravasation** (Lat. *extra*, outside, beyond; *vas*, vessel). Outpouring of fluid into the tissues from an injured vessel. The most familiar example is the extravasation of blood which may follow a blow on the skin resulting in the formation of a bruise.

**Extreme Unction** OR SACRAMENT OF THE DYING. Fifth of the seven sacraments of the Roman Catholic Church. It was instituted for the spiritual and bodily comfort of those in *extremis*. Recognized also in the Greek, Coptic, Armenian, and Nestorian Churches, with varying ceremonial, and dating from the 12th century, it is regarded as authorised by James v, 14-15, and is administered by the priest, who anoints the dying person.

Unction is usually applied to the seat of each of the five senses, with prayer, e.g. "Through this holy unction, and His most tender mercy, may the Lord pardon thee whatever sins thou hast committed by seeing. Amen." With the other senses the necessary word is used in place of "seeing." In Roman usage the oil is applied in the form of a cross, after reception of the Viaticum or Holy Communion. In the Church of England the rite was abolished in 1552, the Protestant claim being that the words of S. James have reference to a miraculous cure, and that the anointing ceased to have efficacy with the withdrawal of miraculous powers from the Church. See Sacrament.

**Exudation** (Lat. *ex*, from, out; *sudare*, to sweat). Emission of a liquid constituent or mixture of ingredients from a solid or gelatinous explosive. The material ejected is also occasionally termed the exudation. Dynamites which have become damp and blasting gelatines which have been subjected to pressure and high temperature are liable to exude nitroglycerine, when the material becomes highly dangerous owing to the sensitive nature of this explosive.

**Exuma.** Two of the Bahama Islands, known as Great and Little. They lie S.E. of Andros Island and W. of Long Island. Great Exuma is 30 m. in length and contains the chief settlement, Georgetown. The area of the two islands, including the numerous cays (low islands), is about 250 sq. m., and the total pop. is 3,465.

**Eyam.** Parish and village of Derbyshire, England. It stands in Eyam Dale, 5 m. N. of Bakewell.

In the churchyard is a Runic cross, and there are several barrows, one of which, on Eyam Edge, is more

and brilliant as it was 500 years ago, and they so improved the method of oil painting that they made it virtually a new medium. They were not, however, as sometimes alleged, its discoverers.

A 10th century MS. by the monk Ercolus (*De Coloribus et Artibus Romanorum*) states that a method of grinding colours with oil was then "in the air," and Rogierus, a monk of the 12th



Eyam. Cottages dating from the plague of 1665-66, when three-fourths of the inhabitants died

than 100 ft. in diameter. During the plague in 1665-66 the greater part of the population perished. Pop. 1,224. *Prom. Eem.*

**Eyck, HUBERT VAN** (c. 1366-1426). Flemish painter. He was born at Maeseyck, in the province of Limburg. Before settling at Ghent as a court painter, early in the 15th century, he spent a considerable time in N. Italy. He began, and his brother Jan completed, the famous altar-piece of The Adoration of the Lamb, executed for the cathedral of S. Bavon, Ghent, where he died, Sept. 18, 1426. Certain panels sold in 1816 and long in German possession were restored in Oct., 1920, under the treaty of Versailles. Both painters rank among the very greatest of the Flemish school. Their drawing and finish were meticulously exact, their colouring is almost as fresh



Hubert van Eyck, Flemish painter  
From an old print

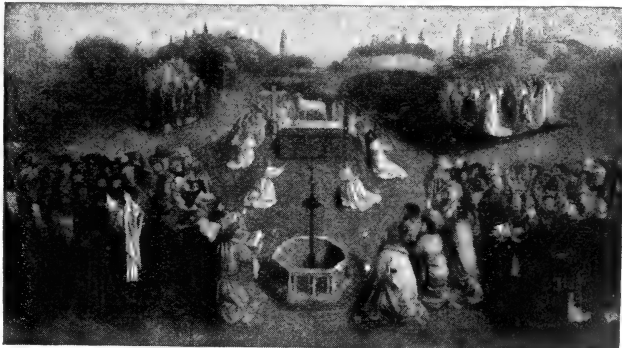
century, recommended that colours should be ground with oil and mixed. The nature of the improvement introduced by the Van Eycks seems to have been regarded as a craft secret, but it is conjectured that it was some essential oil which yielded a clear, transparent, liquid vehicle, which retained its limpidity, dried without darkening, and, when mixed with colours, gave results so superior as to supersede the viscous varnishes formerly in vogue.

**Eyck, JAN VAN** (c. 1385-1440). Flemish painter, brother of Hubert. Born at Maeseyck, he appears to



Jan van Eyck, Flemish painter  
From an old print

have resided in The Hague from 1422-24, at Bruges for a few months in 1425, in which year he went to Lille, where he remained for four years, and later visited various foreign countries in an official capacity as painter to fulfil State commissions.



Van Eyck. The Adoration of the Lamb, the central panel of the altar-piece at the cathedral of S. Bavon, Ghent, the masterpiece of the Van Eyck brothers

He died at Bruges on July 9, 1440. He is represented at his best in the National Gallery, London, by the magnificent picture of John Arnolfini and his Wife, and at the Louvre by the exquisite Chancellor Rollin Kneeling before the Virgin.

Of Margaret van Eyck (c. 1377-1430), his sister, nothing is known beyond the bare fact that she also was an excellent painter. Some writers have even questioned her existence. See Hubert and Jan van Eyck: their life and work, W. H. J. Weale, 1908.

**Eye.** The organ of vision. Well protected from injury by its situation in the bony orbit, it possesses an extensive range of vision, the movements of the globe being effected by three pairs of opposing muscles. The eyeball consists of segments of two hollow spheres, of which the smaller, representing about one-sixth of the whole, is anterior. This segment is convex anteriorly and projects in front of the remainder of the globe. It is covered by the cornea, which consists of five layers of transparent cells, the innermost layer known as Descemet's membrane.

The posterior and larger sphere, rather longer transversely than in other directions, is formed by three tunics or coats, the sclerotic externally, the choroid and iris medially, and the retina internally. The sclerotic is white in colour externally, tough and fibrous, and forms the chief means by which the shape of the globe is maintained. It is perforated posteriorly by the optic nerve and by blood-vessels, forming the *lamina cribrosa*, and is attached internally by a layer of delicate connective tissue (*lamina fusca*) to the choroid. The choroid consists mainly of pigment and blood-vessels. Chocolate-brown in colour, it extends forward to the ciliary ligament, where it is con-

nected with the iris, and where its inner surface is thrown into folds known as ciliary processes.

The iris (rainbow) forms a thin contractile curtain, having a perforation, the pupil, which is slightly to the nasal side of the centre, for the transmission of light. The iris is of different colours in different individuals; the colour varying from light blue to dark brown according to the amount and position of the pigment contained. In the albino this pigment is entirely absent. Composed of radiating and circular muscular fibres which are innervated by fibres of the sympathetic nerve and of the third cranial nerve respectively, it regulates the amount of light entering the eye.

The pupil contracts or dilates according as the eye is exposed to a bright or dim light. The iris is immediately in front of and in contact with the lens. The retina consists of three principal layers, chiefly of nerve tissue. The external layer is formed by terminal cells of the optic nerve called from their shape rods and cones. Exactly in the centre of the posterior part of the retina, and in a line with the central axis of the globe, is the yellow-spot in which the sense of vision is most acute. At a distance of one-tenth of an inch to the nasal side of the yellow-spot is the point of entrance of the optic nerve. It possesses no vision and therefore is known as the blind-spot.

The refracting media of the eye constitute the contents of the globe and consist of the aqueous humour, the crystalline humour or lens, and the vitreous humour. The aqueous humour fills the space between the cornea and the lens. It is very small in quantity, weighing from 4 to 5 grs. The vitreous humour forms four-fifths of the entire globe. It is perfectly transparent, of the consistency of thin jelly, and is enclosed in a delicate transparent membrane. The crystalline humour is a double convex lens with the greater curvature posteriorly. It is situated immediately behind the pupil, and is held in place between the aqueous humour in front and the vitreous humour behind by an elastic capsule and a suspensory ligament. It measures about  $\frac{1}{2}$  in. across and about  $\frac{1}{4}$  in. antero-posteriorly. Its shape is modified by the action of

the ciliary muscle which surrounds the outer edge of the iris and is more convex when accommodating, that is to say when a near object is being viewed.

Rays of light entering the eye should be brought to a focus on the retina. If the globe is too long in its antero-posterior dimension, as in the short-sighted, it is necessary to place a concave lens before the eye to throw the focus farther back. With advancing years the cornea and the crystalline lens tend to become flattened, and the lens partly loses its ability to alter its shape when accommodating, a condition known as presbyopia. Therefore, it frequently is necessary, after middle life, to



Eye, Suffolk. The parish church of SS. Peter and Paul, whose tower is a magnificent specimen of E. Anglian dressed flint work

use convex lenses when reading or occupied in near work. See Blindness.

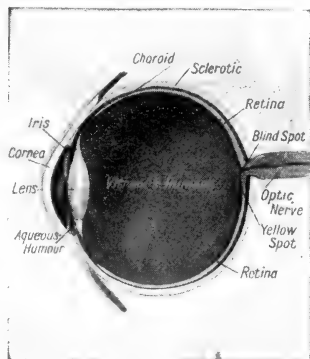
H. E. Davison

**Eye.** Small hole, or loop, at the top of certain articles. Eyebolts are screw bolts with a ring in them. The eyes of a sail are holes which take the lashings when reefing. A Flemish eye is the end of a rope bent to form a loop.

**Eye.** Mun. bor. and market town of Suffolk, England. It stands on an affluent of the river Waveney 19 m. N. of Ipswich, on the G.E.R. An ancient town, it has castle ruins, a grammar school founded in 1566, a town hall and corn exchange. Brewing is an industry. Market day, Mon. It gives its name to a co. div. returning one member to Parliament. Pop. 2,001.

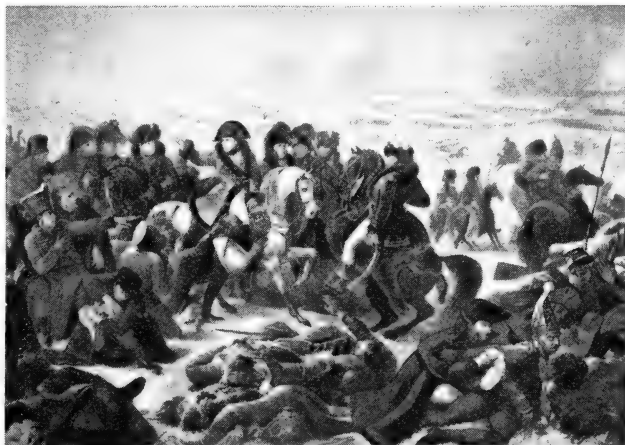
**Eyebars.** Metal bar with one or both ends enlarged. In the enlarged end a hole is drilled so that by means of a pin or bolt the end of the bar may be secured to another object. Eyebars vary in size, from a fraction of an inch in diameter up to the great eyebars used in the Quebec bridge, each sustaining a pull of 300 tons.

**Eyebolt.** Bolt with one end formed like an eye or rigid ring instead of an ordinary head. Eyebolts are used for many purposes, e.g. as door fastenings and attachments for stays and guys.



Eye. Sectional diagram showing formation and principal parts of the eye





Eylau. Napoleon riding across the battlefield after his victory over the Russians, Feb. 8, 1807. From a painting by Baron Gros

Louvre Museum, Paris

**Eyebright** (*Euphrasia officinalis*). Small annual herb of the natural order Scrophulariaceae. A native of N. Europe, N. and W. Asia, and N. America, it is a parasite upon the roots of grasses, sedges, etc. The leaves are oval or lance-shaped, with cut edges, the flowers small, white, veined with purple, and the middle lobe of the lip yellow. It grows in meadows and heaths.

**Eyemouth.** Burgh of Berwickshire. It stands at the mouth of the little river Eye, 8 m. from Berwick, and has a station on the N.B. Rly. It is a fishing centre, for which industry there is a good harbour, protected on the N. by St. Abb's Head. The town hall is the chief public building. Pop. 2,450.

**Eye-piece.** Lens of a telescope nearest to the eye. In a telescope light falls in nearly parallel rays on the object lens, which throws an image of the field of vision. The eye-piece enables the eye to form an image of the image.

The eye-pieces used with astronomical telescopes vary in form. The first telescope made by Galileo had a bi-concave eye-piece such as opera glasses now have. This eye-piece is placed between the object glass and the focus at which the image is thrown. Convex eye-pieces are placed outside the focus. But both these kinds of eye-pieces colour the light coming from the image owing to the refraction of the rays. Huygens discovered that this defect might be remedied in the eye-piece by employing two plano-convex lenses, both with the flat sides towards the eye, the larger placed nearer the image, and the smaller nearer the eye. This construction is in general use, except

for micrometer eye-pieces, which have spider-webs for measuring the sizes of the different objects. In these the flat sides are both turned away from the eye. See Telescope.



Eyebright. Foliage and flowers of *Euphrasia officinalis*

**Eye-Witness.** Pseudonym of Col. W. S. Swinton (*q.v.*) He was the first to write accounts of military operations in France and Flanders for the press, under official sanction, during the early part of the Great War (1914-15).

**Eylau.** Town of Prussia. It stands on the Pasmar, about 24 m. from Königsberg, and is noted for the battle fought here, Feb. 8, 1807, between the French under Napoleon, and the combined Russians and Prussians. After his de-

feat at Pultusk, Dec. 26, 1806, Bennigsen, who, pursued by Napoleon, had begun to retreat upon Königsberg, decided to make a stand at Eylau. In an engagement on Feb. 7, 1807, Bagration and Barclay de Tolly, after several assaults by the French, were forced to abandon the village.

In a snowstorm on the morning of the 8th the battle developed. The emperor could only bring into the field Augereau's and Soult's corps, together with six divisions of Murat's cavalry; his other troops were hurrying up over snow-bound roads. An advance by the French from Eylau was beaten back and the Russians attacked in force against Eylau windmill. Augereau's 7th corps was thereupon ordered by Napoleon to stem the Russian advance. The day was going against the French, and the battle reached a crisis when Augereau's troops, blinded with driving sleet and snow, enfiladed by artillery and attacked by infantry, suddenly had a mass of cavalry launched against them. Augereau was hit, and all his colonels and brigadiers were killed or wounded.

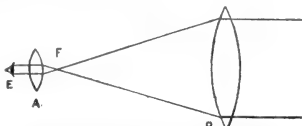
The French broke, and were in full flight when Napoleon hurled 18,000 of Murat's cavalry upon the Russians. The effect was decisive. The Russians were scattered, regiments were ridden down in the blinding snow, the squares were broken, 16 standards were taken, and the victorious French only stopped on encountering Bennigsen's reserves. As the afternoon wore on, with the arrival of Napoleon's reserves, the day was won, and Bennigsen retired on Königsberg, having lost 18,000 men and 24 guns. The French losses amounted to 15,000 men. Napoleon brought into action altogether 79,000 men; the Russians numbered 75,000. *Pron.* Ile-ow.

**Eyot** (A.S. *iget*) or **Art.** Islet in river or lake, especially one overgrown with willows. *Pron.* eight.

**Eyra.** S. American wild cat. Resembling a large weasel with a long tail, it is reddish brown in colour, without stripes. It ranges from Mexico to Brazil, and is a trouble to the poultry farmer.

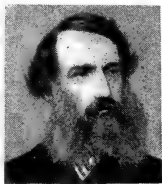
**Eyre.** Lake in S. Australia. It is 4,000 sq. m. in area, but in dry seasons merely a salt marsh. In wet seasons the Barcoo and Diamantine rivers flow into it. Edward John Eyre discovered it in 1840.

**Eyre.** Word derived from the Latin *iter*, a journey. It is used chiefly in connexion with the itinerant justices sent out by Henry II and known as justices in eyre. In Scotland the form *aire* came into use. See Henry II; Judge.



Eye-piece. Diagram showing principle of working. E, eye; A, eye-piece; F, focus; B, object lens

**Eyre, EDWARD JOHN** (1815-1901). British explorer and colonial governor. Born at Hornsea,



Edward J. Eyre,  
British explorer

Yorkshire, Aug. 5, 1815, he emigrated to Australia in 1833, and carried out valuable explorations of unknown territory, especially of the coast between Adelaide and King George Sound, in 1841. He went to New Zealand as governor in 1846, to St. Vincent, 1854, and to Jamaica, 1861. His stern handling of the negro rising there in 1865 caused his recall to England, where his action roused wide controversy. In 1872 the government repaid the legal expenses which he had in self-defence incurred, and awarded him a pension in 1874. He died Nov. 30, 1901.

**Eyre, SIR JAMES** (1734-99). English lawyer. Born at Wells, he was the son of a clergyman. From Winchester he went to St. John's College, Oxford, and became a barrister. He was counsel for the defence of John Wilkes in 1763. From his post as recorder of London he was promoted in 1772 to be a judge; in 1787 he became chief baron of the exchequer and in 1793 chief justice of the court of common pleas. He remained at the common pleas until his death, July 1, 1799, having been for a few months commissioner of the great seal when there was no lord chancellor, and having presided at the trial of Horne Tooke.

**Eyre, SIR VINCENT** (1811-81). British soldier. The son of a soldier, he was born Jan. 22, 1811, and educated at Norwich Grammar School. He joined the service of the E. India Co. in 1828 and, in the artillery, was with the force that entered Afghanistan in 1840; after the siege of Cabul by the Afghans he and his family were surrendered to them as hostages. In 1843 they were rescued by a relieving force, after which Eyre commanded the artillery at Gwalior. During the Mutiny he distinguished himself by his prompt action in marching against some rebels at Arrah and defeating them also at Jagdespur. He held a command in the force that relieved Lucknow, was recommended for the V.C., and retired as a major-general in 1863. During the Franco-Prussian War he organized an ambulance service. He died at Aix-les-Bains, Sept. 22, 1881. Eyre wrote an account of his imprisonment in Afghanistan.

**Eyre's Peninsula.** Tract of land in S. Australia. It lies between the Great Australian Bight and Spencer Gulf, an area of sand, scrub, and salt marsh. Port Lincoln, near its apex, exports wheat.

**Ezekiel, Book of.** One of the prophetic books of the O.T. Ezekiel was both priest and prophet. He was one of the priests of Jerusalem, who, with King Jehoiachim and other members of the upper classes, were deported to Babylon in 597 B.C. by Nebuchadnezzar (605-562 B.C.). The exiles were settled at different points, Ezekiel becoming a member of the community at Tel-abib, near the river Chebar, which has been identified with the grand canal in the neighbourhood of Nippur. We are told that the prophet received his call in the fifth year of the reign of Jehoiachim (592 B.C.).

The book falls into five divisions: (a) the prophet's call and consecration, Ezek. i, 1-iii, 15; (b) discourses on the imminent destruction of Jerusalem, Ezek. iii, 16-xxiv, 27; (c) oracles against Ammon, Moab, Edom, Philistia, Tyre, Sidon, and Egypt, Ezek. xxv-xxxii; (d) prophecies of the restoration of Israel and the overthrow of her foes, Ezek. xxxiii-xxxix; (e) vision of a restored theocracy of a united Israel, Ezek. xl-xlviii. The book itself assigns definite dates to many of the prophecies, the latest mentioned being about 570 B.C. On one occasion the prophet admits that a prediction had not been fulfilled. In Ezek. xxvi, 7-14, Nebuchadnezzar is expected to capture Tyre. Tyre, however, did not fall, and in Ezek. xxix, 17-21, Nebuchadnezzar is promised Egypt as a recompense.

The authorship and integrity of the book of Ezekiel present no difficulty. The difficulties are associated with the Hebrew text, often obscure and corrupt. As the author was a priest, it is not surprising to find that he lays more stress than the other great prophets on externalities, rites, and ceremonies. We find points of affinity with the priestly phraseology of the later legislation, which has been called the Code of Holiness (Lev. xvii-xxvi). But due emphasis is laid also upon personal responsibility and personal religion. He has been described even as "pastor rather than prophet."

Ezekiel's visions of the chariot and cherubim (Ezek. i, 1-iii, 15) had considerable influence on the later symbolical literature. They have been interpreted (e.g., by the Rabbis) as a synopsis of theosophy. The vision of the valley of dry bones in Ezekiel xxxvii has

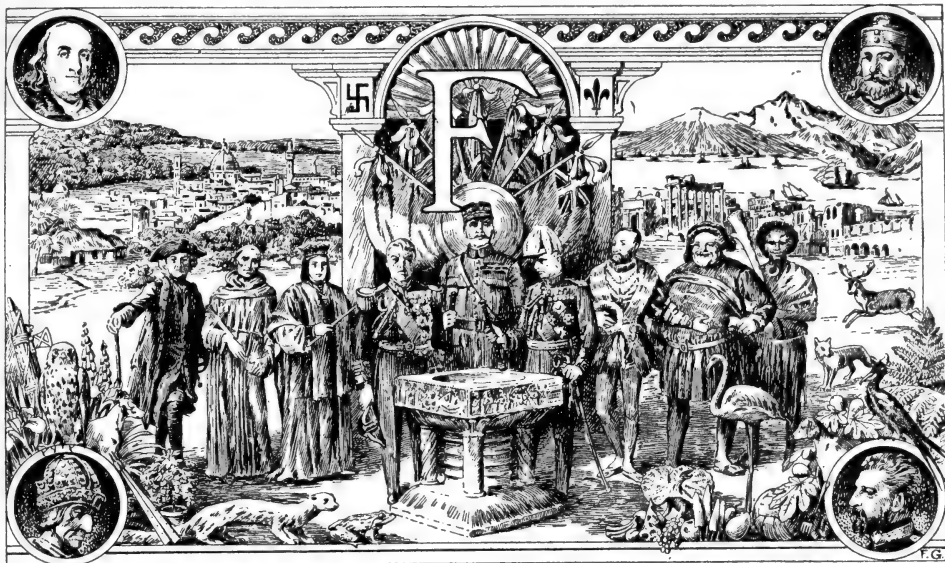
become famous. In Ezekiel xxxviii and xxxix occur the curious creations Gog and Magog. Gog, perhaps suggested by Gyges, king of Lydia, is a prince from the land of Magog, who leads a great host of nations against the restored Israel, and is defeated ignominiously. In the later Jewish eschatology Gog and Magog are represented as leading in vain the final attack of the powers of the world upon the Kingdom of God.

**Bibliography.** *Intro.* to the Literature of the O.T., S. R. Driver, 8th ed. 1909; *The Books of the O.T.*, O. C. Whitehouse, 1910; *Critical Intro.* to the O.T., G. B. Gray, 1913; *Lit. of the O.T.*, G. F. Moore, 1914.

**Ezra, Book of.** Book of the O.T. Ezra was a Jewish scribe living in exile in Babylon, under Artaxerxes Longimanus. He is said to have belonged to the priestly line, and to have been a descendant of Seraiah, the high priest when Jerusalem was captured by Nebuchadnezzar. About 458 B.C. he was allowed to return to Jerusalem with about 1,500 men, in addition to women and children. There he found that the remaining Jews had intermarried with heathen women, and great laxity prevailed, and he set out to restore worship and order. He started the rebuilding of the Temple, and restored the text of the Jewish law.

The O.T. Book of Ezra is closely related to the Book of Nehemiah, so closely indeed that, as the Talmud and early Christian writers indicate, they form really one work. Closely related to them are the Books of Chronicles, of which Ezra and Nehemiah are a continuation. The three-fold work, Chronicles-Ezra-Nehemiah, covers the history of Israel from the period of Adam to the second visit of Nehemiah to Jerusalem in 432 B.C.; but the history is viewed from a different standpoint from that of the other O.T. books from Genesis to Kings, namely an ecclesiastical and priestly standpoint.

**Ezra—Nehemiah** (which together appear in the Septuagint as II Esdras) includes the history from 538 B.C., when Cyrus issued a decree permitting Jewish exiles to return, to 432 B.C., when Nehemiah made his second visit to Jerusalem. The Ezra portion records the return of the exiles, the rebuilding of the temple, and the mission of Ezra, who was sent as royal commissioner from Babylonia to Jerusalem by Artaxerxes. Part of the book is written in Aramaic (iv, 8-vi, 18, and vii, 12-26). Ezra-Nehemiah seems to have been compiled from various sources, including the Memoirs of Ezra and Nehemiah, between about 300 and 250 B.C.



**F.** Sixth letter of the English and Latin alphabets. Its form is that of the old Greek digamma, the double Gamma, one Γ being superposed on the other. It is a hard labial (lip-sound), the corresponding soft letter being V. Its ordinary sound is as in *fat*. In the single word of it is pronounced as *v*, but in its compounds as *hereof*, *thereof*, it commonly retains the hard sound. In halfpenny both *f* and *l* are mute (*hā-pen-y*). In the plural, *f* is often softened, as in *loaf*, *loaves*. The sound of *f* is also represented by *ph* in words derived from the Greek, as in *philosophy*, *phrase*. See Alphabet; Phonetics.

**F.** In music, the fourth note of the natural scale of C. *F* is only a semitone above E, instead of a whole tone. *F* sharp is the first sharp to appear in a key signature—key of G. See Key Signature; Pitch.

**F.A.** Abbrev. for Football Association (*q.v.*).

**Faber, Frederick William** (1814–63). British divine. Born at Calverley, Yorks, June 28, 1814, he was educated at Balliol College, Oxford, and became rector of Elton, Huntingdonshire. In 1845 he succeeded to the Roman Church, and four years later became superior of the Oratory of S. Philip Neri, now at Brompton. A popular preacher, he is best known by his

hymns, which include *Sweet Saviour, bless us ere we go*, *Hark, Hark, my soul*, and *Souls of Men, why will ye scatter?* He died at Brompton, Sept. 26, 1863.

**Fabia.** One of the oldest Roman gentes or clans, probably of Sabine origin. They appear to have been originally priests, who took part in the supervision of the festival Lupercalia (*q.v.*). They were a patrician clan, whose chief families were those of Ambustus, Labeo, Maximus, and Pictor.

**Fabian Society.** English political organization. Founded in 1884 to promote the principles of socialism, it was so called because its promoters preferred the slow and sure methods of the Roman general, Fabius Maximus, to violence. It has attracted the most intellectual socialists, such as G. B. Shaw and Sidney Webb, and exercised an influence greater than its numbers alone would merit. It has sought to influence public opinion by lectures and writings, directed especially to the more thoughtful part of the population, and by taking an active part in elections, especially those for the government of London. The society, which is officially connected with the Labour Party, has offices at 25, Tothill Street, Westminster, S.W. Since 1912 it has had a labour research department, and the weekly *New Statesman* is closely connected with the society. See Socialism.

**Fabius Maximus, Quintus** (d. 203 B.C.). Roman general. He was appointed, with dictatorial powers, to the command of the Roman forces after the defeat by the Carthaginians at Lake Trasimenus, 217

B.C. By a series of delaying tactics—whence his surname, *Cunctator* (the delayer)—Fabius avoided pitched battles with Hannibal, wore down the offensive power of the Carthaginians, and gave the Romans time to reconsolidate their forces. He thus paved the way for Scipio's victories, which ended the Second Punic War. Fabian tactics have become proverbial for a waiting and cautious policy.

**Fabius Pictor, Gaius.** Painter of a battle scene, the first recorded Roman painting, on the walls of the temple of Salus (Safety) in ancient Rome (c. 302 B.C.). In the reign of Claudius both temple and picture were destroyed by fire.

**Fabius Pictor, Quintus** (c. 225 B.C.). Earliest Roman historian. His writings, which were in Greek, are lost, with the exception of some fragments, but he was one of the authorities used by Livy, Diodorus Siculus, and Polybius. A Latin version was also in existence, whether by himself or a later writer is doubtful.

**Fable** (Lat. *fabula*, story, narrative). Short allegorical story in which generally animals, trees, etc., are endowed with speech and human qualities, and by their words and deeds are made to convey moral lessons. Its invention is frequently ascribed to Aesop (*q.v.*), but many fables associated with his name probably originated at a much earlier date in India, where they are known sometimes as the fables of Bidpai or Pilpay, a traditional ancient Indian philosopher, and sometimes as the work of Buddha. Some of the fables



*F. W. Faber*

traditionally ascribed to Aesop are but variants of those found on ancient Egyptian papyri. Many, too, are traced to the Arabs, by whom they may have been brought from India.

It is probable that tales of a fabulist character are common to most primitive peoples, mark, indeed, a definite stage in race-culture; the addition of a "moral" to any beast tale being a natural development, and not peculiar to one originating writer or people. Of later fabulists the French writer La Fontaine is perhaps the most celebrated. See editions of Bidpai, 1888, and Aesop, 1889, by Joseph Jacobs: *The Big Book of Fables*, ed. Walter Jerrold, 1912.

**Fabliaux.** Short tales in verse, almost always octosyllabic couplets, dealing from the comic point of view with incidents of ordinary life. The fabliaux appeared in France in the 12th century, and remained popular for about 200 years. The tales are licentious both in subject and treatment, frequently satirising priests or women or both in language that is generally coarse, but many of them have real humour and the best are free from objection. The fabliaux were first collected and published by Barbazon in the 18th century, and were re-collected and issued in six volumes by Anatole de Montaiglon and Gaston Raynaud in 1872-90. Averaging 200-300 lines in length, the fabliaux, with their smallness of range, delicacy of argument, wit, irony, and provocative treatment, are the direct ancestors of the French short story.

**Fabre, FERDINAND (1830-98).** French novelist. Born at Bédarieux, Hérault, he studied for the priesthood, medicine, and the law in turn before producing his first novel, *Les Courbezons*, 1862. He died in Paris, Feb. 11, 1898. A moderate realist, he depicted with minute fidelity the people and manners of the Cévennes, as in *Le Chevrier*, and excelled particularly in studies of clerical life, as in *L'Abbé Tigrane*, 1873, and *Mon Oncle Célestin*, 1881. See French Profiles, E. W. Gosse, 1905.

**Fabre, JEAN HENRI (1823-1915).** French entomologist. Born at Sainte-Leone, Aveyron, his early years were passed in great poverty. At 18 he was in charge of a primary school, where he improved his knowledge of mathematics and physics in his spare time, and where he bought his first book on entomology. Becoming professor of philosophy in the college of Ajaccio and in the Lycée at Avignon, he turned his attention to the study of insects. His earliest ob-

servations appeared in the *Annales des Sciences Naturelles*, 1855-58, subsequently enlarged in *Souvenirs Entomologiques*, 10 vols., 2nd ed. 1914, etc. The earlier volumes are remarkable for their close and painstaking observations on living



Jean H. Fabre,  
French entomologist

insects, bringing to light many unsuspected habits and instincts of wasps and bees in particular. His work, though gaining the praise of Darwin, failed to win popular attention. The insect's Homer, as he has been called, Fabre's reputation has been steadily increasing. A curious blend of White of Selborne and Darwin, he displays not only most amazing powers of minute and careful observation, but his writings have an unusually high literary quality. He died Oct. 11, 1915. See *Works*, complete Eng. trans. A. Teixeira de Mattos, 1912, etc.

**Fabre d'Eglantine, PHILIPPE FRANÇOIS NAZAIRE (1750-94).** A French revolutionary and dramatist. Born at Carcassonne, July 28, 1750, he became a member of the National Convention and for a time was secretary to Danton. His play *Philinte* attracted some attention in 1790, but perhaps his most successful literary achievement was the renaming of the months for the revolutionary calendar, 1793. He was guillotined on a false charge of forgery, April 5, 1794.

**Fabriano.** City of Italy, in the prov. of Ancona. It stands on the E. slopes of the Apennines, at an alt. of over 1,000 ft., 45 m. by rly. S.W. of Ancona. It has a cathedral, a town hall, and some of the churches contain pictures of the Fabriano school. The city is celebrated for its paper mills, established in the 13th century. Gunpowder, glue, parchment, and felt are also made, and there is trade in cattle and cereals. It is the rly. junction for Urbino. Pop. 23,752.

**Fabric** (Lat. *fabrica*, workshop, skilled production). Word used for any kind of manufactured cloth. By an extension it is also used for the outer body of a building, as the fabric of a church or, figuratively, the fabric of the constitution. See Textiles.

**Fabritius Luscinus, GAIUS (c. 280 B.C.).** Roman general. He won notable victories over the Lucanians, Bruttians, and Samnites, and in the war with Pyrrhus twice conducted negotiations with

that monarch. After the Roman defeat at Heraclea in 280 B.C. Pyrrhus tried hard to buy Fabritius' over, but the stern Roman was incorruptible. Later, after Fabritius had delivered up a traitor who had offered to poison Pyrrhus, negotiations were resumed, with the result that in 278 satisfactory terms of peace were arranged. During his censorship in 275 he made great efforts to check the growing tendency to luxury and extravagance. He himself died so poor that his daughters had to be provided with dowries by the state. Fabritius was lauded by subsequent generations as the embodiment of the old republican virtues. *Pron.* Fab-rish-i-us.

**Fabricius, JOHANN ALBERT (1668-1736).** German classical scholar. Born at Leipzig, Nov. 11, 1668, at the age of 25 he removed to Hamburg, where shortly after publishing his *Bibliotheca Latina*, 1697, he became a professor at the gymnasium. His later works on classical bibliography, storehouses of learning and still indispensable, included *Bibliotheca Graeca*, 1705-28; *Bibliotheca Ecclesiastica*, 1718; and *Bibliotheca Latina Mediae et Infimae Aetatis*, 1734. He died at Hamburg, April 30, 1736. *Pron.* Fab-reet-s-i-oos.

**Fabrizi, NICOLA (1804-85).** Italian patriot. Born at Modena, April 4, 1804, he was implicated in the Carbonari insurrection of 1831. He fled to Marseilles and thence to Spain, where he fought against the Carlists, 1837. One of Mazzini's most trusted agents, he moved to Malta, whence he assisted the Sicilian insurrection of 1848. When revolution broke out in Italy, he fought at Venice and Rome, retiring to Malta after the fall of Rome. He raised a revolt in Sicily in 1860 and joined forces at Palermo with Garibaldi, who made him governor of Messina and war minister. He opposed Garibaldi's Rome campaign of 1862, but in 1867 fought at Mentana. He died March 31, 1885. *Pron.* Fab-reet-si.

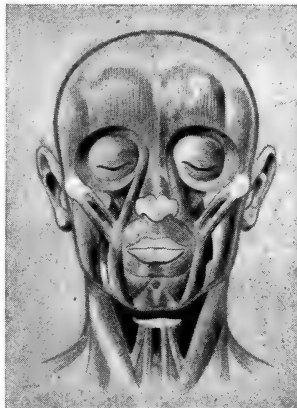
**Fabroni, ANGELO (1732-1803).** Italian biographer, called "the Plutarch of modern Italy." Born at Marradi, Tuscany, Sept. 25, 1732, he became prior of San Lorenzo, Florence, in 1767, and was appointed tutor to the sons of Leopold, grand duke of Tuscany, in 1773. His chief work was *Vitae Italarum Doctrina Excellentium qui Saeculis XVII et XVIII floruerunt*, in 20 vols., 1778-1805, vol. 19 containing his autobiography. He also wrote biographies of Lorenzo de' Medici, 1784; Cosimo de' Medici, 1788-89; and Petrararch, 1799. He died Sept. 22, 1803.

**Façade** (Fr.). Architectural front of any building or part of a building. Not necessarily confined to the principal front, the term is mostly used in connexion with street architecture, where one face of the building is mainly important. A façade is, strictly, a front in one plane. Thus a front with one or more pavilions projecting from its surface could not be referred to as a single façade, the pavilion having its own façade. *See* Architecture; also illus. p. 508.

**Face.** Front of the head. The face may be divided into the regions of the forehead, temples, ears, eyes, nose, mouth, cheek, and upper and lower jaws. The bones of the face are fourteen in number, twelve being in pairs, namely: the superior maxillary, malar, nasal, palate, lachrymal, and inferior turbinated bones. The mandible or lower jaw and the vomer, which forms part of the septum dividing the nose into two parts, are single bones.

The palate bone is situated deeply in the region of the mouth and nose. Besides these bones, some of the bones assigned by anatomists to the cranium also take part in the formation of the face, namely: the frontal, parietal, sphenoid, and temporal bones. The forehead is formed by the frontal bone. Underlying the scalp is the frontalis muscle, contraction of which causes the furrows which appear on the forehead when the brows are lifted to express surprise. Running up on each side of the forehead is the temporal artery which, in elderly persons, is often prominent and well marked, owing to thickening of the walls of the vessel, an indication of senility. The superciliary ridges are bony prominences above the eyes, best seen in adult males. These ridges were strongly developed in certain prehistoric forms of man, particularly the type known as Neanderthal man. The vertical furrows seen in the act of frowning are produced by a small muscle, the *corrugator supercili*.

The eyeball is situated in a bony framework known as the orbit, which, together with the projection of the nose, serves to protect it from injury. The aperture between the eyelids is known as the palpebral fissure. The nose is divided into two parts by a septum formed partly of bone and partly of cartilage, the junction of the two being marked by the bridge of the nose. The outer angle of the orbit is prolonged towards the ear into a bridge of bone known as the zygoma. The temporal muscle occupies a fossa



**Face.** Diagram showing the muscles of expression in the human face

forming the greater part of the temporal region, its tendon passing beneath the zygoma to be attached to the lower jaw. This muscle takes part in the act of mastication, and can be felt contracting when the mouth is firmly closed. The anatomical features of the ear, chin, and mouth are described under their respective headings.

The principal nerves of the face are the fifth or trigeminal nerve, which is the main sensory supply to the face, and the seventh or facial nerve, which supplies most of the muscles of the face. The face is well supplied with blood-vessels, which explains the profuseness of haemorrhage following injury to the tissues.

**Face Conveyor.** Machine used for the transport of coal. The transport of coal from the point where it is cut out of the working face comprises three stages—from the face to the main haulage way; the main haulage to the foot of the shaft; the raising of the coal to the surface. The first stage is relatively costly, and often difficult on account of the very limited space usually available, and particularly the low roof. Although usually performed by manual labour, of recent years very ingenious mechanical appliances known as face conveyers have been introduced.

The jiggig conveyor consists essentially of a long steel trough suspended on short arms in such a way that the trough may be "jiggig" to and fro. The coal is shovelled on to the trough, and at each stroke or movement is thrown or jerked bodily forward a short distance until it is finally thrown off the end of the conveyor. The chain conveyor consists of a fixed trough or bed

along which a chain is drawn. The chain is composed of bars of steel, forming links and cross-pieces all of which have their faces vertical. The coal is thrown on to the chain, the large pieces being carried along on the tops of the links and cross-pieces, while the small drop through the chain to the bottom of the trough, and are scraped forward by the under edges of the chain. These machines admit of being moved forward as the working face is extended, and are driven either by compressed air or electrically. A Blackett patent chain conveyor can remove 360 tons from a face of 100 yards in eight hours. *See* Coal; Conveyor; Mining; also illus. p. 2238.

**Face Value.** Nominal value of debentures, stocks, shares, and securities generally, as opposed to their real or market value. For instance, the face value of consols is in £100 and multiples of £100, and of a share in the Amalgamated Press £1, although in each case the selling value is very different.

**Fâcheux, LES** (The Bores). A three-act comedy-ballet or masque by Molière. Written and played within a fortnight, it was first produced in the garden of Fouquet's residence, Vaux-le-Vicomte, Aug. 17, 1661. It displays ten bores, satirical portraits from society, who prevent an ardent young lover from speaking with the object of his devotion. It was the first play written by Molière for Louis XIV, and the first play of its kind on the French stage.

**Facial Angle.** Method of measuring the facial profile, especially in man and the anthropoid apes. The earliest, Pieter Camper's (c. 1770), was subtended by two lines (1) drawn from the glabella to the upper jaw, (2) drawn in a plane passing through the



**Facial angle.** Diagram illustrating method of measuring facial angle



base of the nose and the centre of the aural orifice. This measures 40° (orang-utan), 70° (negro), 80° (European). Camper's angle is now superseded. *See* Craniometry.

**Facial Nerve.** Seventh cranial nerve. It supplies most of the muscles of the face, and the sense of taste in the anterior part of the tongue. Paralysis of the facial nerve (Bell's Palsy) may be due to injury to the brain, blows near the lower part of the ear, and syphilis, but most commonly is caused by exposure to cold. Movements on the affected side are lost, the eye cannot be closed, the lower lip drops, the forehead cannot be wrinkled. The difference in the two sides is obvious when the patient smiles. When due to injury of the brain or nerve, recovery cannot be expected, but is possible where the paralysis has followed exposure to cold.

**Facility** (Lat. *facilis*, easy). Ability to perform anything easily. In Scots law it has a special meaning. By it is understood a condition of mental weakness that falls short of idiocy. The person suffering from it is one easily persuaded.

**Facings.** Cloth of contrasting colour worn on the collar and cuffs of the full dress military uniform. In general the facings are of white cloth, but regiments entitled to the prefix royal, King's Own or Queen's Own, wear blue facings, and in a few cases, for example the Buffs and the Sherwood Foresters, special coloured facings are authorised on account of historical or similar associations. *See* Uniform.

**Facsimile** (Lat. *fac simile*, make like). Term meaning an exact copy. It is used chiefly for the reproduction of ancient MSS. and the like, e.g. facsimiles of Domesday Book. *See* Process; also illus. pp. 424 and 447. *Pron.* fac-simily.

**Factor** (Lat. *maker*). In mathematics, any of two or more numbers or expressions which when multiplied together produce a given number or expression. Thus 7, 3, 2 are factors of 42 and  $(a+b)$ ,  $(a-b)$  of  $a^2-b^2$ . A factor which can only be divided by itself and unity is called a prime factor. The factor of the greatest degree which is common to two algebraic expressions is called the highest common factor. In arithmetic the highest number which is a factor of two or more numbers is called the greatest common divisor. *See* Algebra; Mathematics.

**Factor** (Lat. *facere*, to make). Word meaning an agent, but in a special sense an agent who buys and sells for a principal. He carries on business in his own name, but

differs from a broker in that he usually handles the goods in which he deals and transfers them to his principal; moreover, he has a greater latitude about buying and selling. In English law several statutes have regulated the relations between a factor and his employer, these having been consolidated by the Factors Act of 1889. Much, however, is left to custom, and this differs obviously very much between one trade and another. The main provision of the Act is to give the principal a valid title to the goods bought for him by the factor, as in transactions of this kind this was the main difficulty.

Factor is used in Scotland for a man who manages an estate, a land agent. A judicial factor is one appointed by a court of law to manage the estate of a minor or imbecile.

**Factor of Safety.** Ratio or figure which indicates the maximum strength of any part of an engineering structure in relation to the maximum stress which it is called upon to bear. The figure is obtained by dividing the stress under which the body collapses by the maximum stress which it is subjected to in ordinary usage. Thus a factor of safety of five to one indicates that the part so described is five times as strong as the maximum stress which will be placed upon it. The figure is not wholly accurate, since in actual use there may be set up stresses above those calculated for. In aeroplane structures the factor of safety is replaced by the factor of loading, based on the forces acting on the aeroplane in horizontal flight.

**Factory.** Building or assembly of buildings devoted to the manufacture of goods. Factories are defined by the Factory Act, 1901, as premises wherein "steam, water, or other mechanical power" is used in aid of the manufacturing process carried on. Most important are the textile group, where cotton, wool, silk, and other fabrics are made. The non-textile factories include engineering works, iron mills, foundries, and blast furnaces, paper mills, lace warehouses, dyeing and chemical works. The employment of mechanical motive force distinguishes all of these from workshops, where the power is supplied by human effort.

#### Considerations as to Site

In planning a modern factory, the first consideration is that of site. The buildings should be near the sources of the principal raw materials needed, and conveniently placed for the transport of goods into and out of the factory. Coal being a prime necessity for almost

all machinery, coalfield areas attract a large proportion of the factories. In alkaline works, however, where salt and lime are also first necessities, it is cheaper to erect the building over brine supplies than to be within immediate reach of lime and coal at the cost of transporting brine in large quantities.

The most usual type of modern factory consists of a group of light, well-ventilated, one-storey buildings, so constructed that they can be readily expanded or adapted as need. But the structures vary widely in character, according to the nature of the industry followed there. Proximity to railways, roads, and waterways is an obvious requirement. Other considerations are accessibility for workers, good supplies of water, and a dry, bracing air. The last-named condition has a marked influence upon output. The same individual workers, transferred from a low, humid site to an airy position, have been shown to respond by substantially increased production. In a well-designed factory the buildings are so placed that the internal transport of goods is reduced to a minimum. Each stage of manufacture naturally involves transference to another workshop; but the journey should be the shortest practicable.

#### Example of Sound Planning

The Bayer Chemical Works afford an instance of sound planning. Placed between the river and the railway, the factory receives its raw material by water. The first processes of manufacture are carried on in buildings adjoining the wharves. Thence the products pass to neighbouring workshops, and from these to the next group, and the next, as they undergo the successive stages of manufacture—moving meantime in a direct line away from the river, until the finished goods reach the packing department beside the railway by which they are to be dispatched. A centrally placed power station distributes motive power radially to each department. Its central site ensures the utmost economy in transmission.

Labour-saving devices, especially those that avoid lifting and carrying goods by hand, such as continuous belt conveyers, are profitable. Light railways between the shops enable heavy products to be transmitted from point to point with the minimum of effort. At the Maypole Dairy Company's model factory in Southall, the force of gravity is utilised so that bulky materials are made to slide over frictionless bearings, from stage to stage, by their own weight. Modern engineering shops are provided

with every type of hoist and pulley for the easy handling of heavy castings.

Electricity is increasingly employed to supply power to the shops; but the earlier system of large central dynamos with huge shafts and many driving belts is replaced more and more by small electric motors at various points, each being supplied with current, which can be converted into power at will.

#### **Expenditure and Economy**

Fearless expenditure and vigilant economy are required to ensure success. Large savings have been effected by the utilisation of waste and of by-products. In a steam-heated factory, the warm water arising from condensation of the vapour is usually "fed" to the boilers instead of cold water from the main. A substantial saving of fuel is thus effected. Coal tar, once thrown away in the process of preparing coal-gas, has proved to be of greater value than the gas itself. Otherwise useless rubbish is burnt in a destructor, the resultant heat being duly turned to account. The sheets of tinned iron "scrap" from tinware factories, formerly discarded as useless, are now chemically stripped, and the recovered tin is used again.

The work of a factory is technically divided into two classes: (a) the actual process of manufacture, and (b) the services which facilitate those processes. The latter and subsidiary branch comprises the supply of power, maintenance of buildings, repair of tools and machines, packing and labelling finished products, and the care of the workers.

A typical factory includes most or all of the following departments:—

(a) *Manufacture*: Receipt and storage of raw material; actual manufacture (in successive stages); finishing and assembling; packing, labelling, and analysis; and dispatch. (b) *Services*: Transport by motor, rail, or water; power (including water services, light, heat, and motive force—hydraulic, steam, or electrical); engineers' shop and stores; social service (rest rooms, canteens, etc.); time-keeping; accountancy, and store-keeping.

Each manufacturing department is restricted to a single phase of the complex process of converting the raw material into the finished product. To coordinate the output of all these independent parts, so that none of them is kept idle by any other, is a task requiring the closest care, and it is upon such fine adjustments and economies that the margin of profit often

depends. Under the general control of the departmental managers, a foreman in charge of each workshop is responsible for the work it turns out.

The modern tendency in favour of a shorter day for the factory hand appears to be justified even upon purely economic grounds. Experimental studies in the psychology of fatigue as exhibited in factories, have afforded surprising results. Ten minutes rest per hour was found to increase the hourly output, and an eight-hour day to be more productive than one of nine hours. But the enormous sums now sunk in machinery require a longer working day than before, so that the earning capacity of the machines may be increased.

#### **Psychology of Factory Life**

The problem is solved by employing two shifts of labour daily, of 7 or 8 hours each. It is found that a weekly or fortnightly change of shift has a beneficial effect on the psychology of factory employees, and stimulates their powers of work. Strict cleanliness, order and quiet in the work-rooms, and tools and equipment exactly adapted to their function, have similar results on output.

Increased care for the worker's well-being, thus justified by financial as well as moral considerations, is not restricted by providing him with better physical conditions at his work. Many factory owners maintain a "social service" department, supplying rest rooms, libraries, and recreation grounds, and promoting schemes for sport and study. They regard as proven the contention that the master key to successful factory control is health and content in the worker.

**Ernest A. Carr**

**Factory Acts.** In the United Kingdom, a series of over twenty statutes, aimed at regulating conditions in factories and workshops, especially on behalf of women and children. The first was passed in 1802, Addington's Act, "for the preservation of the health and morals" of apprentices, etc., employed in cotton and other factories; child employees were not allowed to work more than 12 hours a day nor later than 9 p.m., and had to be taught the three R's in working hours.

The Act of 1833 barred the employment of children under nine years of age at factories and provided *inter alia* for an eight-hour day for children under 13, for certain holidays, and for factory inspectors. The 1844 Act initiated the following interpretations, viz. "young person," between 13 and 18 years old; child, under 13 years;

it laid down that women were to be employed on the same conditions as to hours as young persons, who, together with children, were not to work on Saturdays after 4.30; and regulated the fencing of machinery. The 1847 Act set up an eleven-hour day maximum for factory workers and a ten-hour day for women and young persons, with a 58 hours' maximum for the week.

Lord Ashley (earl of Shaftesbury) was perhaps the most prominent of the reformers of abuses which for years disfigured the industrial system in the 19th century. Other Factory Acts were passed at intervals to safeguard the workers further from accident, disease, or oppression, and to provide for the education of children employed at factories before national education was adopted.

Important changes were made by the 1874, 1878, 1883, 1891, 1895, and 1897 Acts, but the present law is contained in the consolidating Factory and Workshop Act, 1901, of 163 sections. By this Act a young person is between 14 and 18 years and a child under 14, unless such child, though over 13 and under 14, has obtained an educational certificate of proficiency. A child is not allowed to clean machinery, and women and young persons may not clean machinery in motion. Minute provisions are laid down for ventilation, sanitary conveniences, means of escape from fire, as to inspection and accidents, and working hours.

#### **Working Hours for Women**

In textile factories the hours for women and young persons must not exceed 66 a week, which period includes at least 10 hours for meals, and they must not start before 6 a.m. or leave off after 7 p.m. There are detailed working-hour limitations for this type and other classes of factories. The Saturday half-day is stereotyped with few exceptions. No female may be employed within four weeks after her confinement. Children who work half-time are not to be employed otherwise. For these classes of employees Sunday work is barred, with specific exceptions, and overtime and night work are the subject of restrictions.

In 1911 a further Factory Act was passed empowering the Home Secretary to make regulations for cotton cloth factories, and a statutory order was made for the regulation of "home-work." There are now many women as well as men inspectors, and during the Great War welfare committees were set up throughout the industrial system on behalf of the workers. See Children; Labour.

**Factory Inspector.** Class of British civil servants attached to the Home Office. Stationed all over the country, they serve under a chief inspector, and supervise the observation of the laws regulating employment in factories and workshops; they are concerned with the hours of labour of women and young persons, sanitary conditions, etc. Some inspectors are women, and in 1920 women became eligible for all posts. See *Factory Acts*.

**Faculae** (Lat. *facula*, small torch). Bright spots on the sun's granular surface, most often found associated with the dark sun-spots. They appear after sun-spots, and reaches of them may stretch tens of thousands of miles. High in the sun's atmosphere, they escape some of its absorptive influence, and thus acquire their brilliancy of aspect. See *Sun*.

**Faculties.** COURT OF. Court held on behalf of the archbishop of Canterbury. It takes no litigation, but is merely for the purpose of granting faculties to perform certain actions in connexion with church buildings, to be married otherwise than by the publication of banns, or at a place or time outside the ordinary places and hours, or to be made a public notary. The president is the judge of the court of arches and the court has a registrar and other officials. Its offices are at 23, Knight-riding Street, Doctors' Commons, London, E.C. In the archdiocese of York similar work is performed by the archbishop's chancery court, while in the ordinary dioceses consistory courts are held in the names of the various bishops. See *Ecclesiastical Law*.

**Faculty** (Lat. *facultas*, facility, ability). Word having several meanings. One indicates any special mental power; e.g., the faculty of speech. This use has come down from the early philosophers. Derived obviously therefrom is the use of the word for a department of a university, and for its instructors, thus in modern universities we have the faculties of arts, medicine, law, theology, science, etc. Similar is its occasional application to the members in a collective sense of a learned profession, e.g., the faculty of advocates in Scotland.

In English ecclesiastical law and usage the term means a permission to do something which is not allowed by the common law; e.g., to be married otherwise than by the publication of the banns, or to make an alteration in a church. For such matters as the altering of churches, putting up monuments, etc., therein, each bishop deposes his chancellor to hear the application. See *Ecclesiastical law*.

**Faed, THOMAS** (1826-1900). Scottish painter. Born at Gatehouse of Fleet.



Thomas Faed,  
Scottish painter

Born at Gatehouse of Fleet, Kirkcudbrightshire, June 8, 1826, he studied art at Edinburgh, and painted many scenes of Scottish life, humorous and pathetic. A.R.S.A. in 1843, he came to London in 1852, and became A.R.A. 1861, and R.A. in 1864. He died, Aug. 17, 1900, almost blind, at St. John's Wood. His *Faults on Both Sides*, *Silken Gown*, and the *Young Highland Mother* are in the Tate Gallery.

**Faenza** (anc. Faventia). City of Italy, in the prov. of Ravenna. It stands on the Lamone, 31 m. by rly. S.E. of Bologna. Surrounded by medieval walls, it has for centuries been famed for its art pottery called "faience" (q.v.). On the principal square are the cathedral (1474), the former palace of the Manfredi, now the city hall, and the church of S. Michele. There is an arcaded market-place, and the municipal art gallery has frescoes, sculptures and fine specimens of local majolica. Silk spinning, weaving, and sulphur refining are carried on. Founded as Faventia by the Romans, it was the scene in A.D. 542 of the defeat of the Byzantines by Totila, and was prominent in the medieval wars of the Guelphs and the Ghibellines. Captured in 1240 by Frederick II, it fell successively to the Manfredi, the Borgia, Venetians, and the popes. Pop. 40,164.

**Faery Queene, THE.** Poem by Edmund Spenser published in 1590-96. The published poem consists of six books, divided into 12 cantos, between 50 and 60 stanzas in each canto, and is written in nine-line stanzas, each ending with a twelve-syllable line. The poem blends the Arthurian legend of knights errant with classical lore, Christian teaching, and allegory, both general (concerning the virtues and vices) and particular (concerning people of the poet's time). Devised as an allegory on a grand scale, and only half completed, it remains a wonderful medley of poetic romance, shot through with threads of allegory, full of descriptive beauty and rich verbal music.

**Fafnir.** Treasure-guarding worm or dragon of Scandinavian and Teutonic mythology. In both a smith's brother is supposed to have been transformed into this form. In the Scandinavian *Volsung Saga*, Sigurd slays Fafnir, guardian

of Ardvare's hoard, and is there-after known as Sigurd Fafnirbane; while in the Nibelungen Lied Siegfried kills Fafnir, who guards the great Nibelung hoard.

**Fagaceae.** Natural order of trees. The fruit is enclosed in a cup, and the order includes the sweet chestnut (*Castanea*), oak (*Quercus*), and beech (*Fagus*).

**Fagan, JAMES BERNARD** (b. 1873). British dramatist. He was born May 10, 1873, and educated at

Clongowes Wood College and Trinity College, Oxford. He gained an intimate knowledge of stagecraft during four years as an actor. His first play, *The Rebel*, was performed in 1899. It was followed by *The Prayer of the Sword*, 1904; *Under Which King*, 1905; *Hawthorne, U.S.A.*, 1905; *The Earth*, 1909; *A Merry Devil*, 1909; *The Dressing Room*, 1910; and *Bella Donna*, adapted from Robert Hichens's novel, 1911.

**Fagging.** Old-established system at English public schools under which the older boys are empowered by the school authorities to exact certain duties from the younger boys. The duties, formerly heavy, now consist of running errands, tidying studies, etc., and games' fagging. The system, sometimes elaborately organized, varies at different schools. All boys are liable to fagging until they reach a certain form. As a rule the sixth form alone are entitled to fags, but some schools extend the privilege to the fifth and also to the cricket eleven and football fifteen.

**Faggot Voter.** Name given to a class of voters, now non-existent at elections in England. The main qualification for a vote in the counties was the ownership of land worth 40s. a year. When instituted in the 15th century this meant a considerable estate, but in the 18th century it meant little. Landowners therefore gave patches of ground to their servants and dependants on the implied condition that they voted as their masters wished, a practice not completely destroyed till the Reform Act of 1884.

**Fagin.** Character in Dickens's novel *Oliver Twist*. A disreputable old Jew, he is a prominent member of the criminal gang to which Bill Sikes belongs, and is hanged for complicity in Sikes's murder of Nancy. His special province is the



James B. Fagan,  
British dramatist  
Russell

training of children to be thieves and pickpockets. In Comyns Carr's adaptation of Oliver Twist, produced at His Majesty's, July 10, 1905, Beerbohm Tree played Fagin to the Nancy of Constance Collier and the Sikes of Lyn Harding.

**Fagotto.** Italian name for the bassoon, the bass wood-wind instrument. See Bassoon.

**Faguet, ÉMILE (1847-1916).** French critic and literary historian. Born at La Roche-sur-Yon, he



Émile Faguet,  
French critic

became professor of poetry at the university of Paris, 1897. His writings, which are characterised by a catholicity of taste and a flexibility of judgement reminiscent of Sainte-Beuve, include *La Tragédie au XVI<sup>e</sup> Siècle*; a series of studies of great French authors of the 16th, 17th, 18th, and 19th centuries; *Politiques et Moralistes du XIX<sup>e</sup> Siècle*; and monographs on Voltaire, Flaubert, and Zola. He died, June 6, 1916. See Émile Faguet, A. Seché, 1904.

**Fa-Hien** OR **FA-HSIEN** (c. A.D. 400). Chinese traveller and antiquary. A Buddhist monk, he set out in 399 from the ancient capital Hsian-fu, Shensi, for a prolonged pilgrimage of the Buddha's cradleland. Traversing the Gobi desert, mostly afoot, to Khotan, he crossed the Hindu Kush into the Afghan valleys, and remained ten years, visiting Peshawar and the Ganges cities. He proceeded by sea in 412 to Ceylon, whence he returned home in 414, with numerous pictures, images, and books. The account of his pilgrimage was translated into French by J. P. Abel Rémusat, 1836; into English by S. Beal, 1869, and James Legge, 1886.

**Fahl Ore** (Ger). Steel-grey copper ore consisting of copper, sulphur, antimony, arsenic, silver, iron, and zinc. The silver sometimes runs to 30 p.c., such an ore being known as argentiferous grey copper ore, or formerly silver fahlerz. Owing to the arsenic and antimony it is not easily worked as a copper ore; but a rich silver content makes it worth while to treat it for that metal primarily. It is found in Cornwall, Germany, Chile, and Mexico. See Copper.

**Fahlum** OR **FALUM.** Town of Sweden, cap. of the *len* or govt. of Kopparberg. It stands near Lake Runn, 57 m. by rly. W. of Gefle. The town was burnt down in 1761. Its only notable feature is the 14th

century church, which escaped the fire. Minor buildings include the town hall, a mineralogical museum, and technical schools. Its copper mines, once the richest in Europe, now nearly exhausted, have been worked for six centuries, and the company owning them has existed since about 1345. Iron pyrites, gold, silver, and sulphur are still produced. Fahlum has railway wagon works, wood pulp factories, and textile industries. Pop. 12,213.

**Fahrenheit, GABRIEL DANIEL (1686-1736).** German physicist. Born at Danzig, May 14, 1686, his life was spent chiefly in England and Holland, where he studied physics and constructed meteorological instruments. His name is commemorated by a thermometric scale. He died in Holland, Sept. 16, 1736.

**Fahrenheit Thermometer.** Thermometer invented by G. D. Fahrenheit. He encountered temperatures 32° below the freezing point of water, and fixed that degree of cold as the zero of his scale. The freezing point of water thus became 32°. The difference in temperature between this and the boiling point of water Fahrenheit divided into 180 degrees, so that the latter is 212° F.

The centigrade scale of temperature has the melting point of ice for its zero degree, and the boiling point of water is fixed at 100 degrees. Réaumur's scale (used in Germany) divides the difference between the freezing and boiling points of water into 80 degrees. To convert these scales:

$$F^{\circ} = C^{\circ} + 32 = \frac{9}{5} R^{\circ} + 32$$

$$C^{\circ} = \frac{5}{9}(F^{\circ} - 32) \quad R^{\circ} = \frac{4}{9}(F^{\circ} - 32)$$

See Centigrade; Thermometer.

**Faidherbe, LOUIS LÉON CÉSAR (1818-89).** French soldier and scholar. Born at Lille, June 3, 1818, he entered the engineers, after a military education, in 1840. Almost at once he saw service in Algiers, and in 1854 he was appointed governor of Senegal.

France was then just entering upon her policy of acquiring colonies in Africa, and of this Faidherbe was a pioneer. After holding a command in Algeria, he returned to France in 1870 to lead the army of the north after the disasters at Sedan and Metz. He showed great ability when fighting a number of battles against heavy



L. L. Faidherbe.  
French soldier

odds, but at last he was beaten at St. Quentin. For a short time he sat in the National Assembly, and in 1879 he was elected to the Senate. He died in Paris, Sept. 28, 1889. Faidherbe was also an archaeologist, and wrote an account of his campaign of 1870-71.

**Faidit, GAUCELM (c. 1159-1216).** French troubadour. Born at Uzerche in Limousin, the son of an artisan, his singing gifts attracted the patronage of Richard Cœur de Lion. About 70 of his poems have been preserved, including a beautiful *planh*, or song of sorrow, in memory of Richard. His poems are included in *Chrestomathie Provençale*, C. Bartsch, 6th ed. 1904.

**Faience.** Term loosely used to designate every description of glazed pottery and earthenware painted with decorative designs. The name comes from the Italian city of Faenza, which has made a speciality of this kind of ware from the close of the 13th century. It had a soft paste and thin transparent glaze, which heightened the colours. The very rare French Oiron ware is called Henry II faience. Some varieties from Josiah Wedgwood's work are styled English faience. See Pottery.

**Failsforth.** Urban dist. of Lancashire, England. It is 4 m. N.E. of Manchester on the L. & Y.R. In the Manchester area, although just outside the city boundary, its main industries are connected with the manufacture of cotton. Gas and water are supplied by the Oldham corporation. Pop. 15,998.

**Fainting** OR **SYNCOPE.** Temporary unconsciousness due to insufficient supply of blood to the brain. The condition may be caused by defective action of the heart, sudden violent emotion, over-exertion, loss of blood, blows on the head or abdomen, and other causes. A person about to faint feels giddy, and everything around him seems to be becoming dark. He turns pale, the pupils dilate, the skin becomes cold and often sweaty, and if standing he falls heavily. The pulse is weak and hurried.

Recovery is usually rapid. So long as he is unconscious, the person should be allowed to lie quietly on his back with his head as low as possible, and the clothing about the neck and chest should be loosened. If in a room the window should be opened, and if outside, persons should be prevented from crowding round. Smelling salts may be held beneath the nose, but until consciousness returns nothing should be given by the mouth. When able to swallow, a little brandy or sal volatile in water

may be given. When feelings of faintness first come on, complete loss of consciousness can often be prevented by the person bending forwards and placing his head between his knees at as low a level as possible.

**Fair** (Lat. *feria*, holiday). Periodical assembly of traders at a place and time fixed by charter, statute, or immemorial custom. In early times certain localities came to be used for the periodical exchange of commodities, either by reason of their situation or because they were resorted to at stated times for religious or other purposes. In Greece the Olympic games and such religious festivals as those of Delos and Delphi provided occasions for trading. Among the Incas of Peru fairs were held thrice a month in the most populous places and were visited by the outlying agricultural populations. In ancient Mexico, fairs took place every fifth day in the chief cities.

The earliest royal charter for a fair was granted in 642 by the Frank king Dagobert to the monks of St. Denis, Paris. The concourse of worshippers at a famous shrine afforded great opportunities for trade, and nearly all medieval fair charters were granted to ecclesiastics. The fairs were usually held on a saint's day and on its vigil and morrow, and often, until prohibited by statute, in the churchyard. The religious associations of medieval fairs are indicated by the German word for "fair," *Messe* (mass), and in the term *kermesse* or *kirmess* (church mass) used for the quasi-religious carnivals of Brittany and the Low Countries. In every fair there was a court specially appointed for settling disputes, called in England *pie-powder courts* (*q.v.*).

#### Fairs and Trade

To promote trade, fairs were encouraged by the sovereigns of Europe. During fair time in the 10th century Otto the Great pronounced the ban on breakers of the peace and suspended the right of private feud. In the 14th century the emperor Charles IV's charter for the great fair of Frankfort-on-Main declared fair-goers free from arrest and imperial taxes during the fair as well as for 18 days before and after.

Though fairs were invaluable for international trading, local traders were usually compelled to close their shops in fair time. During the Westminster fair the city tradesmen were commanded to shut their shops, and during the fair on St. Giles's Hill, near Winchester, which lasted 16 days, the Winchester and the Southampton shopkeepers were only allowed to

trade in the fair. The bishop of Winchester was the lord of the fair, and while it lasted the powers of the regular city officers were in abeyance. On the Eve of St. Giles the keys of the city gates were handed over to the bishop, who appointed a mayor, bailiff, and coroner of his own for the duration of the fair.

The influence of country fairs was far-reaching. In 1338 the statutes of St. Mary Ottery's College in Devonshire ordained that 200 lb. of wax for the choir should be bought annually at Winchester fair. In the 15th century the monks of Maxstoke and Bicester laid in their yearly stores at Stourbridge fair, and in the 16th century it was still customary for stewards of country houses to purchase their year's supply of household stores at remote fairs. With the improvement in communications the importance of fairs diminished, and by 1855 all those in London were abolished.

#### "Fun of the Fair"

Amusements formed an important feature of fairs, many of which became mere disorderly revels and were suppressed as nuisances. This was the fate of Donnybrook fair in Dublin, of Charlton or Horn fair, of Greenwich fair, and of all the London fairs. The "fun of the fair" included jugglers, mountebanks, rope-dancers, acrobats, wrestling and other sports, wild beasts, learned animals, freaks and monstrosities, puppet-shows, miracle plays, mysteries, moralities, and stage plays of every description; ballad-singing, grinning through horse-collars, swings, roundabouts, and, in modern times, steam music. Ballad-singers were very popular at fairs; Outroaring Dick and Wat Wimbors, two Elizabethan trebles, were paid as much as 20 shillings a day at Braintree fair. Of fairings, or gifts bought at fairs, the most familiar are the little gingerbread figures, usually gilt, possibly a survival of images of saints.

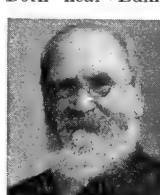
The most celebrated London fair was Bartholomew fair (*q.v.*), and among existing English livestock fairs may be mentioned those for horses at Horncastle (described in George Borrow's *Romany Rye*), Barnet, and Woodbridge; Weyhill, for sheep, and Ipswich, for lambs; Exeter, for cattle and horses; and Carlisle and Ormskirk, for cattle. Nottingham has a goose fair; Falkirk, a fair, or tryst, for cattle, sheep, and horses; and Ballinasloe, co. Galway, one for cattle. Gloucester cheese fair is well known. In parts of England and Wales, and in Scotland, servants are engaged at the hiring, or statute, fairs.

On the continent of Europe, the Lyons fair is supposed to have been founded by the Romans and long enjoyed a great reputation; bills of exchange from all parts of Europe were often made payable at Lyons fair. The fairs of Champagne and Brie were world renowned, and are referred to as early as the 5th century. Those of Frankfort-on-Main and Frankfort-on-Oder and those of Leipzig, especially the great Easter book-fair, are the best known German fairs. The most important Russian fair is the Makaryevskaya fair at Nijni-Novgorod, which lasts from July 29 to Sept. 10. It has been held from remote times at various points on the river Volga, and was settled at Nijni in 1817, taking its name from a monastery near Makaryev, where it was formerly held. The fair comprises over 8,000 shops as well as circuses, theatres, banks, and other buildings. Trade is carried on in cotton, woollens, silk and linen goods, furs, iron, corn, salt, etc.

In the Nile delta Tanta is famous for its fairs, held thrice yearly at the tomb of Said el Bedawi, a 13th century saint. One of the largest fairs in Asia is that at Hardwar, or Hurdwar, in Upper India. The Meccan fairs existed long before the time of Mahomet. In America the term "fair" denotes an industrial exhibition. See *Exhibition*.

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**Fairbairn, ANDREW MARTIN** (1838-1912). British theologian. Born near Edinburgh, Nov. 4,



Andrew M. Fairbairn,  
British theologian  
*Elliott & Fry*

1838, and educated at the university there and at Berlin, for some years he was a Congregational minister at Bathgate and Aberdeen. He became principal of the Airedale Congregational College, Bradford, in 1877, and in 1889-1909 was principal of Mansfield College, Oxford. He was Muir Lecturer at Edinburgh, Gifford Lecturer at Aberdeen, and Lyman Beecher Lecturer at Yale. He published numerous books chiefly on the philosophy of religion, among them *The Place of Christ in Modern Theology*, 1893, and *Philosophy of the Christian Religion*, 1902. He died Feb. 9, 1912.



**Fairbairn, Sir William** (1789-1874). British engineer. Born at Kelso, Roxburghshire, Feb. 19,



Sir W. Fairbairn,  
British engineer

1789, the son of a farmer, in 1804 he was apprenticed to a millwright in Newcastle, and educated himself in his spare time. Coming to London in 1817 he started, in partnership with James Lillie, an engineering business which proved successful. In 1830 he turned his attention to iron boat construction, and in 1835 opened shipbuilding works at Millwall. Moving thence to Manchester he invented a riveting machine, and superintended the construction of the Menai Bridge, 1848. He was made a baronet in 1869, and died Aug. 18, 1874.

**Fairbanks, Charles Warren** (1852-1918). American politician. Born in Ohio, May 11, 1852. He graduated at the Wesleyan university, 1872, and worked for The Associated Press. Admitted to the Ohio bar in 1874, he was elected a Republican senator for Indiana, 1897-1909. He was elected vice-president in 1904. He stood unsuccessfully for the vice-presidency in 1916. He died June 5, 1918.



C. W. Fairbanks,  
American politician

**Fairbanks, Douglas** (b. 1883). American actor. Born at Denver, May 23, 1883, he was educated there and studied mining at the Colorado School of Mines. His first appearance on the New York stage was in 1901. Engagements at various New York theatres followed, and he toured the U.S. from 1908-10 in A Gentleman from Mississippi. About 1914 he took up cinema work, at which he made a great success. In 1920 he married Mary Pickford (*q.v.*), with whom he visited England in that year.

**Fairey.** Name given to British aircraft manufactured by the Fairey Aviation Co., Hayes, Middlesex. The firm's activities have been almost entirely confined to the design and construction of sea-planes, but in 1914 Fairey designed, and in 1916 completed and delivered to the R.N.A.S., one of the first examples of the large, twin-engine type of machines used for bombing. See illus. p. 3068.

**Fairfax, Ferdinando Fairfax**, 2ND BARON (1584-1648). English soldier. The son of Thomas Fairfax, a Yorkshire landowner, he was born March 29, 1584, and when young served against Spain in the Netherlands. In 1640 he succeeded his father as Baron Fairfax of Cameron, a Scottish title dating from 1627, but this did not prevent him from becoming a member of the Long Parliament. Therein, taking the side of the parliament, he was chosen to command its forces in Yorkshire when war began in 1642. He served for about two years, but only met with one or two minor successes; on the other hand, he was routed at Adwalton Moor, and driven from the field at Marston Moor. He died March 14, 1648.

**Fairfax, Thomas Fairfax**, 3RD BARON (1612-71). English soldier. The son of the 2nd baron, he was born at Denton, Yorkshire, Jan. 17, 1612. He went to St. John's College, Cambridge, after which he saw military service in the Netherlands. In 1640 he served against the Scots, but when the civil war began in 1642, he and his father were prominent among the king's opponents.



*From an engraving*

In 1644, on the passing of the self-denying ordinance, Fairfax was made commander-in-chief of the parliamentary armies, and as such was responsible for the victory at Naseby. At the end of the first period of the war he was something of a national hero, but he had little sympathy with the policy of the more violent of the army leaders. He helped, however, to put down the royalist rising in 1648, and was one of the judges appointed to try Charles. But when the trial began he refused to sit, and in 1650 he resigned his position as head of the army, receiving a pension of £5,000 a year. In 1659 he came from retirement, and helped Monk to place Charles II on the throne, going as head of the deputation to The Hague. He was elected as M.P. for Yorkshire to the new parliament, and that was the end of his public career, although he lived until Nov. 12, 1671, dying at Nun Appleton. Fairfax was a man of culture, who wrote two accounts of his campaigns,

verses, and made translations. His correspondence was published in four volumes, 1848-49. See also The Great Lord Fairfax. Sir C. R. Markham, 1870.

Fairfax was succeeded in the barony by his son. It passed to his descendants, coming in 1710 to Thomas Fairfax, who became the 6th baron. He sold Denton Hall, the Yorkshire seat of the family, and settled in Virginia, where he inherited some millions of acres, and lived in princely splendour. His brother, the 7th baron, died without sons, when the title passed to a distant relative. For a time, the heirs being American citizens, it was not claimed, but in 1912 Albert Kirby Fairfax was permitted by the House of Lords to take it. He ranked as the 12th baron.

**Fairfax, Sir James Reading** (1834-1919). Australian newspaper proprietor. Born at Leamington, England, Oct. 17, 1834, he joined the staff of his father's paper, The Sydney Morning Herald, in 1851. Five years later he became a partner, and during the remainder of his life was actively engaged in the management of The Herald and The Sydney Mail, which he founded. Knighted in 1898, he was a director of the Bank of N.S.W., and president of the national art gallery of N.S.W. He died March 28, 1919.



Sir James Fairfax,  
Australian newspaper proprietor

**Fairfield.** Parish of Derbyshire, England, partly within the borough of Buxton. Pop. 4,114. There are a number of other Fairfields in England, one being a suburb of Manchester and another of Liverpool. Fairfield is the name, too, of a mountain (2,863 ft. high), near Helvellyn, in West-morland.

**Fairford.** Parish and village of Gloucestershire, England. It stands on the Coln, 25 m. W.S.W. of Oxford, and has a station on the G.W.R. Its 15th century church, dedicated to S. Mary, and built by John Tame, a London merchant, contains some of the most wonderful stained glass in the country. The 28 windows figure the whole story of the Creation and of the work of Jesus Christ. The village has a fair and was a centre of cloth manufacture. It is visited for trout fishing, and was the birthplace of John Keble. In the neighbourhood are Hatherop Castle and Fairford Park. Pop. 1,410.

**Fair Head** OR BENMORE. Headland on the N. coast of Antrim, Ireland. It is  $4\frac{1}{2}$  m. N.E. of Ballycastle, is 636 ft. high, and being a sheer precipice from a height of 320 ft. presents a superb basaltic columnar formation.

**Fairing.** In aeronautics, any streamline-shaped cover or casing, or any part so shaped that it provides a streamline form. In aircraft construction it is most essential to reduce the wind resistance set up by every part of the structure, and this is attained by giving as far as possible a streamline shape, or in other words fairing them off. The word is used also for a present, originally one brought from a fair. See Aeronautics.

**Fair Isle** OR SHEEP ISLE. One of the Shetland Is., Scotland, about equidistant from that group and the Orkney Is. It is 3 m. long and 2 m. broad, and rises to 480 ft. in Sheep Craig on the E. coast. Fishing, knitting, and sheep-rearing are engaged in. The island has two lighthouses, and is in telegraphic communication with the mainland. Pop. 139.

**Fairlie.** Parish, village, and watering-place of Ayrshire, Scotland. It stands on the Firth of Clyde, 2 m. S. of Largs by the G. and S.W.R. It has a noted yacht-building yard, and there are ruins of a castle. Pop. 800.

**Fair Maid of Perth, THE,** OR ST. VALENTINE'S DAY. Romance of the last years of the 14th century when Robert III was king of Scotland. Published in May, 1828, it forms the second series of Scott's Chronicles of the Canongate. The scene is laid in and around Perth; the titular heroine is Catharine, the beautiful and devout daughter of

Simon Glover, burgess of the city. In addition to the unique study of the Highland lad Conachar (Eachin MacIain), nominally Simon's apprentice, who is destined to be the last chief of the Clan Quhele, and whose inherent cowardice offers a striking contrast to the dauntless courage of Henry Smith (Hal of the Wynd), the armourer who is also Catharine's suitor, the story contains a vivid description of the Palm Sunday battle on the North Inch between the champions of the rival clans Chattan and Quhele.

**Fair Oaks, BATTLE OF.** Federal victory in the American Civil War,



Fair Isle, Shetland Islands, from the east, with the lighthouse on the southern extremity

Valentine

May 31–June 1, 1862, also known as the battle of Seven Pines. In command of the Federals, McClellan was forcing Johnston back upon Richmond when the Southern general made a stand as the Federals were crossing the Chickahominy river. Two of McClellan's corps were already to the S. of the river when they were attacked by Longstreet. Reinforcements were hurried up, and stubborn fighting took place, during which Johnston was severely wounded, being succeeded by G. W. Smith. The next day, June 1, Longstreet's attack was repulsed, and Lee only arrived in time to withdraw the Confederate army to Richmond. About 42,000 men were engaged on either side. The Federal losses were 5,000, the Confederates losing more than 6,000.

**Fair Trade.** Term much used in the United Kingdom during the latter part of the 19th century for what was later called tariff reform. It was used by the opponents of free trade, who demanded that the United Kingdom should only admit the goods of other nations on the same terms

as British goods are admitted there. After languishing for a time the cause revived early in the 20th century in the shape of Tariff Reform. See Free Trade; Tariff Reform.

**Fair Wages Clause.** Agreement in public contracts to protect the wage earner. It is usual to insert in agreements with contractors, who undertake works paid for from public money, a clause to the following effect: "The contractor shall pay his workmen the wages usually deemed fair in the district in the trade to which they belong, i.e. the trade union rate of wages, under a penalty of £— or under

pain of forfeiting the contract at the option of the employer." Formerly a clause was often inserted forbidding the contractor to pay his employees in kind or in anything but money.

**Fairway.** Navigable part of a river or other channel. It is continually under supervision in order to keep it free from obstructions.

**Fairweather.** Mountain of Alaska, U.S.A. It is a volcano in the St. Elias Range, alt. 15,290 ft.

**Fairy.** Legendary or mythical being common to the folklore of most peoples. They are manifested in varied forms, from tiny creatures in human shape which haunt the flowers, to the ordinary size of human beings. Fairies are, however, generally regarded as relatively small, whence it has been surmised that the origin of the fairy myth is to be found in a dim antiquity when surviving races were in conflict with smaller races that have become extinct. The discovery of the African pygmies has lent colour to this; Sir Harry Johnston pointing out that the actions of those dwarf people again and again suggested the traits attributed to the brownies and goblins of fairy lore. Fairies in their many manifestations are some-



The Fair Maid of Perth. Catharine Glover, the heroine of Scott's novel, from a drawing by Charles Landseer, R.A.



Fairey Seaplane, type III C, as adopted by the British Government. See p. 3067

times friendly and beneficent, sometimes mischievous and malevolent.

The term is occasionally employed as covering the whole field of terrestrial supernatural beings, hence Fairyland is a sort of fourth dimensional world that coexists with that in which we live, and the term Fairy stories is applied to all tales introducing earthly beings of an extra-natural character. In poetry and modern fairy stories the fairy is generally represented as a tiny dainty creature. Since fairy originally meant enchantment, and then fairy people collectively, a single fairy is better called fay, *Fr. fée, Ital. fata*, from late Lat. *fata*, a fate or fay, the neut. pl. of *fatum* being used as a singular. See Brownie; Changeling; Elf; Folklore; Gnome; Goblin; Puck; Sylph.

**Bibliography.** Observations on Popular Antiquities, J. Brand, rev. ed. 1893; Fairy Legends of the South of Ireland, T. Crofton Croker, new ed. 1862; Teutonic Mythology, Jacob Grimm, 1835 (Eng. trans. J. S. Stallybrass, 1880-88); Fairy Mythology, T. Keightley, 1847; Science of Fairy Tales, E. S. Hartland, 1889; The Childhood of Fiction, J. A. MacCulloch, 1905; Myths and Legends of the Celtic Race, T. W. Rolleston, 1911.

**Fairy Ring.** Ring of a more vivid green than the surrounding grass of fields, fancifully ascribed to fairies dancing in a circle at night. They are really caused by the growth of certain species of fungi—notably the fairy-ring champion (*Marasmius oreades*)—which, starting from the centre, extend their underground threads (*mycelium*) in all directions, forming a circle increasing every year.

**Faisans, ÎLE DES** (Fr., Pheasants' Isle). Island in the river Bidassoa, lying between France and Spain, about 15 m. S.E. of St. Sebastian. Its position between two frontiers made it on two notable occasions the meeting-place of French and Spanish negotiators. Louis XI and Henry IV of Castile met here in 1463, and Mazarin and Don Luis de Haro here concluded the Treaty of the Pyrenées in Nov. 1659, by which Spain ceded Artois and other northern possessions, and gave up her claims to Alsace and Lorraine, while France gave up territory taken in Italy and N.E. Spain.

**Faith** (Lat. *fides*). In ordinary speech a term used to denote the leap of the mind from the known to the unknown. In the sphere of nature it signifies the acceptance of fundamental assumptions which in themselves are incapable of logical demonstration. The law of the Uniformity of Nature, for instance, is an act of scientific faith enunciating a universal principle

on the basis of certain established data. The fact that the sun has invariably risen at daybreak does not in itself afford a demonstrative proof that it will always rise, but it justifies our faith that such will be the case. In the sphere of human relations the term is also employed to denote the confidence which we feel in other men whose character and integrity are known to us.

From ordinary usage the term naturally passed into the religious sphere—to which it preeminently belongs, and it is commonly used to describe the faculty or organ of the soul by which a man grasps the realities of the unseen and divine universe. What the eye is to the body, faith is to the soul. It is the medium or instrument by means of which the soul enters into communion with God.

Philosophers and theologians have made many attempts at a psychological analysis of the faculty of faith. Some have held that it is a divine endowment—a special religious sense, created in the soul for the purpose of the exercise of spiritual functions. Others have regarded it as an aspect of the emotions analogous to the aesthetic sense. A third school has made it a department of the intellectual side of human nature—while a fourth has located it in the activity of the will. All these theories are inadequate, for intellect, feeling, and will are all involved in the act of faith.

Corresponding to these different views as to the character of the organ of faith, there are similar divergences of opinion as to the scope of its activity. Even in the New Testament itself the term is used in three different senses. In the Epistle of James it is employed to signify the intellectual assent of the mind to the primary Christian beliefs, and from this use of the word has grown up the conception which identifies faith with the acceptance of a creed. In the Epistle to the Hebrews, on the other hand, faith is defined as "the assurance of things hoped for, the proving of things not seen," words which Dr. Moffatt has paraphrased, "Faith means we are confident of what we hope for, convinced of what we do not see." It is out of this interpretation of faith that Christian mysticism developed. To the Apostle Paul faith has still a deeper significance. It implies nothing less than the complete surrender of the soul to Christ as its Redeemer and its living Lord. And it is to this great Pauline idea of faith that the Evangelical interpretation of Christianity owes its genesis and inspiration. See Faith and its Psychology, W. R. Inge, 1909.

**Faithfull, EMILY** (1835-95). British publicist. Born at Headley Rectory, Surrey, daughter of Rev.



Emily Faithfull,  
British publicist

Downey

Ferdinand Faithfull, and educated at Kensington, she devoted the greater part of her life to advocating the claims of women to remunerative employment.

In 1860, in Great Coram Street, London, she founded a printing-office in which women were employed as compositors, and for which she secured the approval of Queen Victoria. Later, in Farringdon Street, she formed the Victoria Press, and was appointed printer and publisher in ordinary to the queen. In 1863 she started a monthly entitled *The Victoria Magazine*. In 1868 she issued a novel, *Change upon Change*. Her lectures in the U.S.A., 1872-73, were described in her *Three Visits to America*, 1884. She received a civil list pension of £50 in 1889 and died May 31, 1895.

**Faith Healing.** Cure of disease by faith in the healing power of God. In the early Church the practice of anointing the sick for the purpose of curing them was a normal function of the clergy, and still survives in an altered form and with different intention in Extreme Unction. In medieval days the touch of a saint or of his relics was resorted to for healing; and down to the time of Queen Anne the British sovereign used to touch persons to cure them of scrofula.

The practice of faith healing is common among certain Protestant bodies, such as the Peculiar People. Most of the miracles at Lourdes and elsewhere are probably examples of faith healing. Such cures are usually effected in functional and nervous complaints, not in cases of organic lesion; and medical science attributes them to the power of suggestion upon the minds of persons who are at the time in a state of strong religious emotion.

**Faithorne, WILLIAM** (1616-91). English engraver. Born in London, he studied painting and drawing under Robert Peake, and engraving with John Payne. Made prisoner by the Roundheads in the Civil War, he pursued his art in Aldersgate prison, and on his liberation proceeded to Paris, becoming a pupil of Robert Nanteuil. Returning to London in 1650, he set up as a print-seller near Temple Bar, retiring in 1680. He died in



**Falaba.** The British liner torpedoed in St. George's Channel by a German submarine, March 28, 1915

Blackfriars, May 13, 1691. Faithorne engraved portraits of most of the conspicuous figures of the Commonwealth and Restoration after Van Dyck, Lely, Dobson, and others, among them the notorious Lady Castlemaine. His portraits of Charles I, Charles II, James II, the Duke of Monmouth, Milton, Thomas Killigrew and Thomas Hobbes may be specially mentioned.

**Faizabad** OR FYZABAD. Division, district, and town of Oudh, United Provinces, India. Faizabad city, the administrative headquarters (with cantonment) of the district, is situated at the junction of three branches of the Oudh and Rohilkhand Rly., and forms with Ajodhya a single municipality. Its chief industry is sugar refining, and it has a large agricultural trade. It is the terminus of the river steamers on the Gogra. The main crops of the district are rice, grain, wheat, lentils, peas, barley, and sugar-cane. Pop., div., 6,646,362, 75 p.c. Hindus; dist., 1,154,109, 90 p.c. Hindus; town, 54,655, 70 p.c. Hindus.

**Fakenham.** Parish and market town of Norfolk, England. It stands on the Wensum, 24 m. by rly. from King's Lynn. It has two stations, one on the G.E.R. and the other on the Mid. & G.N. joint line. The chief building is the church, with a lofty tower. Pop. 3,181.

**Fakir** (Arab. *faqir*, beggar). Religious devotee, especially in India. They numbered in 1911, 787,124 Mahomedan, 175,902 Hindu, 16,187 Sikh, and 80 Jain. The Mahomedans are orthodox members of the marrying dervish orders or unorthodox celibate mendicants who dispense with abstinence, fasting, and prayer. The Hindus include members of the monastic yogi orders devoted to education and poor relief, besides mendicant vagabonds who practise jugglery and resort to mutilations and austerities. See illus. p. 740.

**Fal.** River of Cornwall, England. It rises near Roche, flows S. and S.W. for 23 m. to the

English Channel at Falmouth, and is navigable for nearly 10 m.

**Falaba.** British liner torpedoed by the German submarine U28 S. of St. George's Channel, March 28, 1915. At the inquiry it was stated that the submarine was flying British colours, and its crew wore khaki.

Herr Dernberg attempted to justify this crime by saying that it was a return for Britain's attempt to starve out Germany. The Falaba, 4,800 tons, belonged to the Elder Dempster Co.



**Falaise.** Town of France, in the dept. of Calvados. It stands on the Ante, 20 m. S.S.E. of Caen. It is an agricultural centre, and Guibray, a suburb, is noted for its horse and cattle fairs. Other industries are tanning and the manufacture of hosiery, cottons, and dyestuffs. The chief churches



**Falaise.** The castle where William the Conqueror was born. Above, statue of William by Louis Rochet, erected in 1851

**Falaba.** Town of Sierra Leone, W. Africa. It is fortified, and lies near the frontier of French Guinea, 170 m. N.E. of Freetown, at the junction of many trade routes. There is trade in palm kernels and kola nuts. Pop. 6,000

are S. Gervais, with its fine Norman tower and some beautiful stonework, and the Trinity, but the most interesting building is the castle, famous as the birthplace of William the Conqueror and at one time the residence of the dukes of



**Fakir.** 1. Undergoing thirst ordeal; with the river by his side and jars of water overhead, he abstains from drinking. 2. Lying on a bed of thorns. 3. Rolling his way from shrine to shrine. 4. Seated on a bed of nails

Normandy. It stands on a hill above the town and is largely intact, the remains including the keep and Talbot's Tower, dating from the 15th century. Near the town hall is an equestrian statue of William the Conqueror, and there is a fine Norman church at Guibray. As part of Normandy, Falaise was long a possession of the English kings. In 1450 it was finally captured by the French. Pop. 6,847.

**Falashas** (Ethiop., strangers). Communities of Hamitic stock, mainly between Aksum and Gondar, in Abyssinia. Although allied racially to the Galla, and ignorant of Hebrew and the Talmuds, they profess Judaism, there being three distinct sects. They are farmers and artisans, speaking an Abyssinian (Agao) dialect, and they practise a rigid racial and ritual exclusiveness.

**Falces.** Town of Spain, in the prov. of Navarre. It stands in a plain between the rivers Ebro and Arga, 30 m. S.W. of Pamplona. It has ruins of a Roman castle, but is chiefly known for the mineral springs in the vicinity. Pop. 3,200.

**Falchion.** Type of sword used in medieval times. It was usually slightly curved, rather heavy, and the blade was broader towards the point than at the hilt. The word is derived from Lat. *falx*, sickle. See Sword.

**Falcon** (Lat. *falco*). Name applied generally to the family of birds of prey which includes falcons, hawks, kites, and eagles; but more especially to a sub-family which includes the true falcons, the peregrine falcon and the kestrels. All these have short, curved beaks with one notch in the upper mandible, round nostrils, short pointed wings, and long toes.

Several species of falcon are found in Great Britain. Of these the peregrine falcon builds sparsely on cliffs in the S. of England. It preys mainly on birds, and its ravages among game are compensated by the fact that it only attacks the weaklings, and thus tends to maintain the strength of the breed. It was formerly trained to bring down birds in hawking.

Other species which occur in the British Isles are the Greenland falcon, the Iceland Jer-falcon, and the Scandinavian Jer-falcon, all of which are occasional winter visitors. The birds take their name from the hook-shaped claws (Lat. *fals*, sickle). See Hawking.

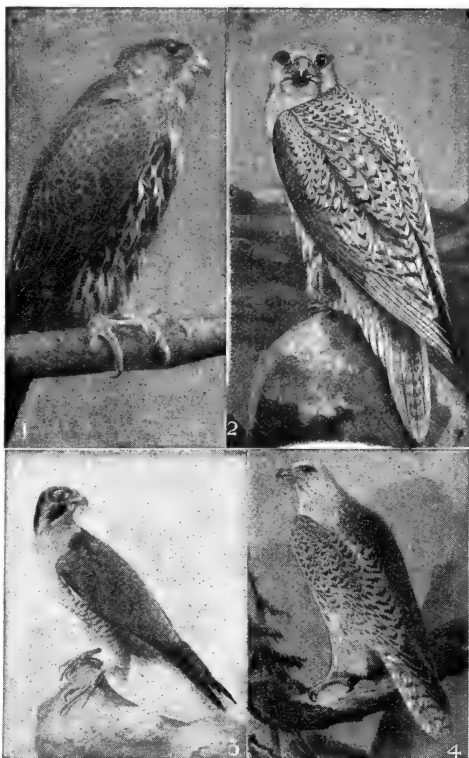
**Falcan.** Volcanic island of the Tongo or Friendly Islands. It is in lat. 20° 20' S. and long. 175° 20' W. It made its appearance above the ocean on Oct. 14, 1885, after a

volcanic eruption. It disappeared for a time but was again uplifted.

**Falcón.** Maritime state of N. Venezuela, facing the Gulf of Maracaibo and Caribbean Sea and bounded S. by the state of Lara. It has been a separate state since 1904, when it was separated from Zulia. The coastal region is low-lying and sterile, but inland there are several ranges of hills with fertile valleys. Agriculture and stock-raising are the chief industries; coffee, cocoa, sugar, cotton, tobacco, and maize are produced. Coal is worked in small quantities, but the mineral resources of the state are virtually untapped. The capital is Coro. Pop. 170,154.

**Falcone, ANIELLO** (1600-65). Italian painter. Born in Naples, he was a pupil of Ribera, and became famous as a spirited painter of battle-scenes. During the insurrection of Masaniello, 1647, Falcone gathered a band of his friends and pupils, among whom was Salvator Rosa (*q.v.*), and this "Company of Death" made many Spaniards pay with their lives for the murder of the leader's nephew and of one of his pupils. Pictures painted of these events are in the museum at Naples. Falcone worked in Paris from 1648-56, when he returned to Naples, where he died. His Fight between Turks and Cavalry is in the Louvre.

**Falconer, HUGH** (1808-65). Scottish botanist. Born at Forres, Feb. 29, 1808, Falconer was educated at Aberdeen and Edinburgh universities, and entered the service of the E. India Company as a surgeon in 1830. His chief interests, however, were in palaeontology and botany, in which sciences he made many important investigations. He experimented in tea-



Falcon. Species found in the British Isles. 1. Iceland Jer-falcon. 2. Greenland falcon. 3. Peregrine falcon. 4. Scandinavian Jer-falcon

planting in India, and also discovered the assafoetida plant, used in medicine. Returning to England for a time, he arranged the Indian fossils at the British Museum, 1844-47, and then returned to India as professor of botany and curator of the botanical gardens of Calcutta, where he worked from 1848-55. Retiring in 1855, he died in London, Jan. 31, 1865.

**Falconer, SIR ROBERT ALEXANDER** (b. 1867). Canadian scholar. Born Feb. 10, 1867, at Charlottetown, Prince Edward Island, he was the son of a Presbyterian minister. His education, begun in Trinidad, was continued at the university of Edinburgh and at German universities, after which, in 1892, he returned to Canada and was ordained in the Presbyterian ministry. He became lecturer at Pine Hill College, Halifax, his subject being N.T. Greek. In 1904 he was made principal of Pine Hill, and in 1907 was chosen president of Toronto University. He was knighted in 1917.

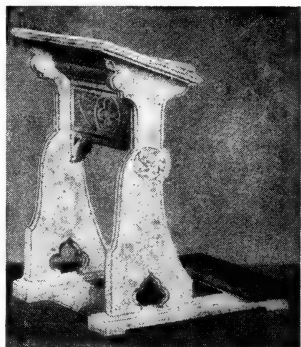
**Falconer, WILLIAM** (1732-69). Scottish poet. Born at Edinburgh, Feb. 11, 1732, the son of a barber,



he became a sailor, and wrote *The Shipwreck*, 1763, a realistic poem, and a *Marine Dictionary*, 1769. He joined the navy, and, Sept., 1769, sailed for India in the frigate *Aurora*, which was lost off Cape Town.

**Falconry.** Sport of hawking and the breeding and training of hawks, more usually known as hawking (*q.v.*).

**Faldstool** (late Lat. *faldistorium*; Ger. *fallen*, to fold, *Stuhl*, stool, seat, or throne). Portable crossed or folding stool so constructed that it can be used as a *prie-dieu* or kneeling desk or a seat. In England it was used by bishops when occupying a seat in the sanctuary other than their throne, or were visiting a church other than their



Faldstool or Litany desk of carved oak

cathedral; and it is still used in Roman Catholic churches. The term is applied to the small, low desk at which the Litany is enjoined to be sung or said, and to the stool at which a sovereign kneels at his coronation. The *faldistorium* on which Queen Mary sat at her marriage with Philip II of Spain is preserved in Langton's chapel, Winchester Cathedral.

**Falemé.** River of Senegal. It forms part of the boundary between the Senegal and Haut-Senegal and Niger colonies. It rises in French Guinea in the watershed separating the Gambia and Bafing rivers, and runs N.N.W. to the Senegal river, which it enters near Bakel. It is partly navigable for small boats during the wet season. Its length is 200 m.

**Falerii.** Ruined city of Etruria. Its site is near the modern town of *Civita Castellana*, 35 m. N. of Rome. One of the league of 12 Etruscan cities, its origin is lost in antiquity. Destroyed by the Romans, 241 b.c., the inhabitants built a new town 3 m. N.W. of the original site. Of the Roman *Falerium Novum* there are many remains, the walls, towers, and

gateways being well preserved, and reputed to be among the most remarkable specimens extant of ancient military architecture. The town was deserted early in the 11th century.

**Falernian Wine.** Famous wine of the ancient Romans. It was light in colour and potent. A wine produced in the district, which is a fertile plain in Campania, near the Volturno river, is called Falerno.

**Falguière, JEAN ALEXANDRE JOSEPH** (1831-1900). French sculptor and painter. Born at Toulouse, Sept. 7, 1831, he studied at the Beaux Arts under Jouffroy, and at Rome. His work was at first classical in manner, but afterwards became strongly realistic. A marble statue of Tarcisus, martyr, now in the Luxembourg, was his crowning success; one may cite also Cain and Abel, *Les Lutteurs*, and the statue of Lafayette. Falguière died at Paris, April 19, 1900.

**Faliero, MARINO** (1279-1355). Doge of Venice. Member of an ancient Venetian family, he defeated the Hungarians at Zara in 1346, and captured the city. Elected doge in 1354, his troubles began with the defeat of the Venetian navy by the Genoese. The unrest caused by this disaster aroused Faliero's ambitions. He allied himself with the leaders of the populace, and a plot was hatched to murder the leaders of the nobility on April 15, 1355, and proclaim Marino prince of Venice. The Council of Ten, learning of the plot, seized Faliero, who confessed his share therein and was executed April 17, 1355.

**Falk, PAUL LUDWIG ADALBERT** (1827-1900). German statesman. Born at Metschkau, Silesia, Aug. 10, 1827, after studying law he entered the Prussian diplomatic service in 1847. In 1867 he represented Silesia in the parliament of the N. German Confederation. Appointed Prussian minister for ecclesiastical and educational affairs in 1872, he successfully opposed Roman Catholic intervention in educational matters, and introduced a law declaring the right of the state to supervise all schools. Instigated by the pope, the bishops ignored this law and various penalties and fines were imposed on them. This brought such odium upon Falk that he resigned in 1879. In 1882 he was given a judicial appointment and he died at Hamm, Westphalia, July 7, 1900.

**Falkenhaynsen, FRIEDRICH, BARON VON** (b. 1869). German soldier. He was born at Potsdam, and entering the army in

1887 had a distinguished career. He commanded the 6th army corps, 1916-17, and in April, 1917,

succeeded von Bissing as governor-general of Belgium, where his rule was more oppressive than that of his predecessor. In one year he had 170 Belgians shot, including women and boys and girls, and he authorised severe penalties, deportations, and floggings. See Belgium.

**Falkenhayn, ERICH VON** (1861-1922). German soldier. He was born at Burg Belchau, Sept. 11, 1861, and entered the German army in 1880. After leaving the Academy of War in Berlin in 1890 he joined the general staff. He served on Count Waldersee's staff in the China Expedition in 1900. In 1911 he commanded the 4th regiment of Guards, and in 1912 was chief of the staff of the 4th army corps. In 1913 he became minister of war, which post he held at the outbreak of the Great War; but in Dec., 1914, he was definitely appointed chief of the general staff, and was its responsible head till removed in Aug., 1916, owing to the failure of the German offensive at Verdun.

In Sept., 1916, he was appointed commander-in-chief of the Ninth Army, composed of German and

Austrian divisions, and after driving the Rumanians from the N. side of the Transylvanian Alps, he forced the passes, and descended into the plains of Wallachia, the first step in the



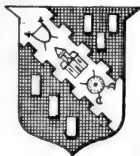
Erich von Falkenhayn, German soldier

overthrow of Rumania. He returned to Germany in 1917 on Mackensen's taking entire control of the Austro-German forces in Rumania, and later went to the Middle East to direct the Turkish operations against the British in Palestine and Mesopotamia, but not being successful was recalled and replaced by Liman von Sanders in March, 1918. He died April 8, 1922. By many, Falkenhayn was regarded as the ablest strategist produced by Germany during the Great War. In 1919 he published *General Headquarters, 1914-16, and its Critical Decisions*, Eng. trans. 1919. See illus. p. 249.



Friedrich von Falkenhaynsen, German soldier

**Falkirk.** Parl. and mun. burgh and market town of Stirlingshire, Scotland. It is 22 m. N.E. of Glas-



**Falkirk arms**

gow on the N.B.R. Falkirk, which embraces the suburbs of Laurieston, Grahamston, Bainsford, and Camelon, is connected by rly. with Grangemouth (3 m. distant), its port on the Firth of Forth, and is the centre of a busy ironworking and colliery district, the Carron, Falkirk, Camelon, and other large ironworks being situated in or near the town. Brewing, distilling, tanning, and the manufacture of bricks, tiles, chemicals, and explosives are flourishing industries. The famous cattle "trysts" or open sales, which were held thrice yearly, have been superseded by weekly markets. The Stirling and

Scots, who were greatly outnumbered, were either dead or in flight.

The second battle was fought between the English, under General Hawley, and the Jacobites, Jan. 17, 1746. Charles Edward, the Young Pretender, returning from Derby, found his way N. barred by the English. His Highlanders, in an impetuous charge, swept away the English troops, and Hawley lost 700 prisoners.

**Falkland.** Royal burgh, mun. burgh, and village of Fifeshire, Scotland. It stands at the N. foot of East Lomond Hill, 36 m. N. of Edinburgh, on the N.B.R. The chief attraction is its palace, formerly the residence of the dukes of Fife, in which David, the duke of Rothesay, heir to the Scottish throne, is said to have been starved to death at the instance of Albany, the regent, in 1402. The palace was a favourite residence of the Scottish monarchs, and here James V sought refuge and died in 1542.



**Lucius Cary, 2nd Viscount Falkland**

*After Van Dyck*

Falkland, but by this time he had inherited from his grandfather, Sir Lawrence Tanfield, the estate of Great Tew in Oxfordshire, and had married Lettice Morrison. His political career began in 1640 with his election as M.P. for Newport. He opposed the worse illegalities of the king, but was never a bitter partisan, and gradually, as the opposition to Charles hardened, he became more definitely on his side. In 1642 he was made a secretary of state. He was at Edgehill with Charles, but soon he fell into the melancholy described by Clarendon, seeing nothing but misery before his country. Expressing a wish to be "out of it ere night," he found the death he desired at Newbury, Sept. 20, 1643, when riding forward alone towards the foe.

Falkland is known mainly from the accounts given of him by his friend Clarendon, and these make him one of the most attractive men of his own or any age. He loved learning and the society of scholars, who gathered in delightful freedom at his hospitable house, Chillingworth and Hales, Suckling, and Waller among them. He wrote *A Discourse of Infallibility*. Of him Clarendon said, "Whosoever leads such a life need not care upon how short warning it be taken from him." The title passed to Falkland's eldest son, but his direct line died out in 1694. It then passed to Lucius (d. 1730), a descendant of the 1st viscount, the ancestor of the present holder. See *Life and Times of Lucius Cary, Viscount Falkland*, J. A. R. Marriott, 1907.

**Falkland Islands.** British crown colony in the S. Atlantic. The islands lie about 320 m. E. of the Strait of Magellan, and 1,000 m. S. of Montevideo. The group contains two large islands and about 100 small ones, with an estimated land area of about 6,500



**Falkirk.** The town from the southwest, looking towards the Firth of Forth. In circle, the parish church which in 1811 replaced the "Speckled Kirk" of 1057-93

*Valentine*

Falkirk burghs return one member to Parliament. Market day, Thurs. Pop. of mun. burgh, 33,574.

**Falkirk, BATTLES OF.** The first battle of Falkirk was fought, July 22, 1298, between the English and the Scots. Under Edward I the English invaded Scotland to crush the rebellion of William Wallace. The two armies met near Falkirk. The Scots, mostly pikemen, were ranged in four circular groups, each ring surrounded by stakes. Between the groups were bowmen and behind a few horsemen. The English knights were in three columns, their traditional formation, flanked and backed by archers. The first line charged, only to founder in a morass in front of the Scots; the second drove away, the bowmen, but made no impression upon the pikes. Edward, therefore, called upon his archers, whose deadly aim soon broke the Scottish rings. The knights seized their advantage, and soon the



Rob Roy occupied the palace in 1715. It fell into decay, but was restored towards the end of the 19th century by the 3rd marquess of Bute. Brewing and weaving are carried on. Pop. 2,356.

**Falkland, LUCIUS CARY, 2ND VISCOUNT** (c. 1609-43). English royalist. He was the son of Sir Henry Cary, a Devonshire man, who, after being lord deputy of Ireland, was made a Scottish peer as Lord Falkland in 1620. Lucius was born about 1609, and educated at Trinity College, Dublin. He saw a little military service in the Netherlands. In 1633 he became Viscount

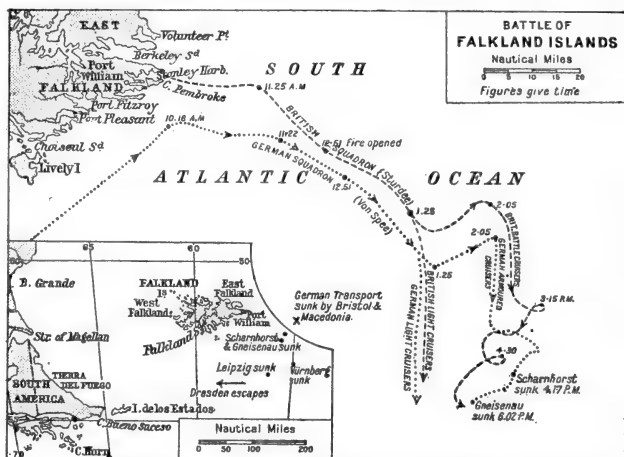
sq. m., excluding S. Georgia, estimated at 1,000 sq. m. The chief are Falkland (area 3,000 sq. m.) and W. Falkland (2,300 sq. m.). The highest point is Mt. Adam (2,315 ft.) on W. Falkland. E. Falkland is hilly in the N., but low-lying, marshy, and boggy elsewhere. Trees are lacking, but grasses flourish; vegetables and green crops are cultivated. The coasts are much indented, affording good anchorage.

The chief industries are sheep-farming and whale fishing; horses and cattle are reared. Apart from the important pastoral industry at the Falklands and the extensive whaling of the dependencies, there are few enterprises of commercial value. A mutton-canning factory has been established, and at S. Georgia sealing is carried on. The climate in the Falklands, although very bleak, is healthy. In the S. Orkneys, S. Shetlands, and Graham Land, the land is covered with snow and glaciers, except in a few low-lying spots during the summer. The almost constant succession of strong winds, snowstorms and fogs makes it a most inhospitable region. The only indigenous mammals are the fox and mouse.

Stanley, the capital, is the only town. It is on E. Falkland, and possesses a good harbour. Regular communication is established, by steamer and wireless, with Great Britain. The Sandwich group (*q.v.*) is also a dependency. The chief exports are animal products. Pop. 950.

The Falklands were discovered by John Davis in 1592, and taken by the French in 1764. Recovered three years later by the British, who were ejected by the Spaniards, and it was not until 1832 that they finally became British. Off these islands Sturdee won a naval victory over a German squadron, under von Spee, in Dec., 1914. In 1917 a committee was appointed to study the development of the resources of the dependencies of the islands. Their report was issued as a blue-book (Cd. 657) in 1920. Pop. of the colony, including S. Georgia, 3,451.

**Falkland Islands, BATTLE OF THE.** Naval engagement during the Great War, Dec. 8, 1914. Following his appointment as first sea lord at the end of Oct, 1914, Lord Fisher took immediate steps to concentrate overwhelming force against the German squadron, which had just destroyed Cradock's two cruisers at Coronel (*q.v.*). He determined to dispatch the two battle cruisers *Invisible* and *Indefatigable* secretly to the Falklands. The force of battle cruisers available for work in British waters was very small, and was reduced to three by



Falkland Islands. Chart illustrating the course of the naval battle of Dec. 8, 1914. Inset, map showing the relative position of the Falkland Islands to the main land

this detachment and by the dispatch of a battle cruiser to N. American waters. On Nov. 11 the two ships left England under Vice-Adm. Sturdee. Off the Brazilian coast they were joined by the old armoured cruisers *Carnarvon*, *Cornwall*, and *Kent*, the light cruisers *Glasgow* and *Bristol*, and the armed ships *Macedonia* and *Orama*. They reached Port William in the Falklands on Dec. 7, and immediately began to coal. In the harbour there was the old battleship *Canopus*, with 12-in. guns, so moored as to act as a floating battery.

Von Spee had heard nothing of the movements of the battle cruisers, and expected to find only a weak British force at the Falklands. His plan was to destroy any vessels there, and then to seize the British naval base. After that he intended to proceed to the Cape of Good Hope, where he expected to be joined by a large number of disaffected Boers. At 7.50 a.m. of Dec. 8 he was sighted off the Falklands. His flag was hoisted in the *Scharnhorst*, armoured cruiser, and with him was her sister ship, *Gneisenau*, the light cruisers *Nürnberg*, *Leipzig*, and *Dresden*, and three transports. As soon as the Germans were sighted Sturdee ordered his ships to raise steam for full speed and at 8.30 sounded for action.

At 9.20 *Gneisenau* approached the wireless station and was fired on by *Canopus*'s 12-in. guns. Supposing that she was being attacked by coast defences of unexpected strength, she turned away; a little later her officers saw the tripod masts of the two British battle cruisers, whereupon all von

Spee's squadron increased speed and steered E. Von Spee ordered his crews to prayers, warning them of the ordeal before them. About 10 the British squadron put to sea, and as the Germans were in good view and reported to be going only 15 knots, the British cruisers steamed for some time at moderate speed (20 knots) to allow the older British vessels to close up. At 12.20 p.m. Sturdee quickened first to 22 and then to 25 knots; at 12.51 the first shots were fired, and a few minutes later the firing became general.

Soon after 1, the German light cruisers parted company with the armoured cruisers and fled S., followed by the British cruisers, while Sturdee with *Invisible* and *Indefatigable* engaged *Scharnhorst* and *Gneisenau*, steaming generally S.E. Sturdee's two ships were now going "all out," and fast overhauled their opponents, who were repeatedly engaged at ranges of 16,000 to 13,000 yards. At 3.30 *Scharnhorst* was on fire; two funnels had been shot away and the red glow of flame could be seen in her. She struggled on gallantly and received a whole series of hits till at 4.4 p.m. she listed, turned over on her beam ends, and sank at 4.17 with every soul on board.

Fire was next concentrated on *Gneisenau*, at ranges of 10,000-12,000 yards. She had been much damaged in the earlier part of the action; now her second funnel was knocked over; and at 5.30 she was badly on fire with steam and smoke pouring from her. Just as the British ships were about to close, supposing that she had ceased resistance, she discharged

several shots, and they resumed their fire. At 5.45 her 8-in. ammunition was exhausted; ten minutes later she heeled over suddenly as her sea-cocks had been opened, and she sank very quickly. Of her crew of over 800 only 94 officers and men could be rescued from the icy water.

Leipzig and Nürnberg were sunk in separate actions by the smaller British cruisers, and 25 of their crews were saved. Dresden was able to escape temporarily, but on March 14, 1915, she was caught by Glasgow and Kent off Juan Fernandez, in the Pacific, and was destroyed in Chilean waters, on the ground that she had been guilty of grave infractions of Chilean neutrality; most of her crew escaped. Thus von Spee's squadron was wiped out with a loss of 2,100 men.

The British loss in the battle cruisers was nil, though Invincible was hit 22 times, twice below water, and inflexible thrice. In Kent, four were killed and 12 wounded by a single hit; in Glasgow, one was killed and 4 were wounded. The strategy which brought overwhelming force to bear was of extraordinary merit, and rendered the battle tactically a military execution. See The Navy in Battle, A. H. Pollen, 1918; Falklands, Jutland, and the Bight, B. Bingham, 1919; The Official History of the Great War, vol. i, Naval Operations, J. Corbett, 1920.

H. W. Wilson

**Fall.** Word used in several senses, all with the idea of dropping down. It is used in wrestling, also for the descent of a river, and the surrender of a fortress. In America it is used for autumn, the time of the fall of the leaf. In the plural it is a common abbreviation for waterfall, e.g. Niagara Falls. See River; Waterfall; Wrestling.

**Fall, THE.** Defection of the first human beings from a state of innocence. This is represented in the Eden story as an act of wilful disobedience to a command of God at the instigation of the serpent. As a consequence, Adam and Eve became conscious of guilt, and were expelled from the Garden of Eden. Theology teaches that the disobedience of our first parents had a threefold consequence in (1) a change of man's relation to God; (2) the loss of certain privileges connected with that relation; and (3) the beginning of a degenerative process which tended to make human nature more and more corrupt and alienated from God.

From this results the doctrine of original sin—that all men are born in a state of sin and are prone to wickedness as a result of Adam's

fall. This may be viewed in two ways. Adam was the representative man, and with Eve constituted the whole human family; so that the whole race fell in him. Or it may be viewed in connexion with theories of heredity, and sin be regarded as a mental and moral tendency transmitted by natural generation. In any case, all orthodox theologians hold that original sin infected the race in all its individuals, and could only be removed by the act of God in Redemption through Christ.

In recent theological development there is a tendency to question the foundation on which the doctrine of original sin depends. This criticism rests on the following grounds: (1) the assumption that the human race started in a state of perfection is in conflict with the findings of modern anthropology and is difficult to reconcile with the doctrine of evolution; (2) the account of the Fall in Genesis does not contain the doctrine; (3) there is no definite trace of the doctrine in the rest of the O.T.; (4) the doctrine of original sin was the creation of the intermediate period between the O.T. and N.T., and first appears in Ecclesiasticus; (5) there is no hint of such a doctrine in the teaching of Jesus; (6) it is doubtful whether Paul accepted the full implications of the theory, though it must be admitted that there is one statement in his epistles (Rom. v, 12) which seems to contain it; (7) the theory is difficult to reconcile with a true conception of Divine justice on the one side and human responsibility on the other. See Sin; consult also The Origin and Propagation of Sin, F. R. Tennant, 1902.

**Fallacy** (Lat. *fallax*, likely to deceive). Term meaning in general a false or mistaken belief or opinion; in logic, a process of reasoning at variance with the recognized rules of the syllogism.

Fallacies may be verbal, real or material, formal (paralogisms). The commonest verbal fallacies arise from the use of ambiguous terms, words used in two different meanings; thus, the word agreeable may be used of an occupation or of a pleasant-mannered person. Ambiguity is the use of an ambiguous phrase or proposition. Similarly, the meaning of a word may be altered by its position in a sentence and by the accent or stress laid on it.

Among material fallacies are *petitio principii*, begging the question or arguing in a circle, where the very thing which it is desired to prove is assumed at the outset; *ignoratio elenchi*, ignorance of the elenchus, in which an attempt is

made to prove or disprove something irrelevant to the question at issue. Formal fallacies consist in violating the rules of the syllogism. Similarly, fallacies occur in the process of inductive reasoning. See Induction; Syllogism; consult also Logic, R. Whately, repr. 1851; Fallacies, H. Sidgwick, 1883.

**Fallières**, CLÉMENT ARMAND (b. 1841). French statesman. Born at Agen, Lot-et-Garonne, Nov. 6,



Armand Fallières,  
French statesman

1841, he studied law in Paris, and became a barrister at Nérac, for which he was elected republican deputy, 1876. He was under-secretary for the interior in Ferry's ministry, 1880, minister of the interior in 1882, 1887, 1889, of justice in 1887, of education from 1883–85, and president of the council in 1883. A senator in 1890, he was president of the senate from 1899–1906. He was elected president of the republic on Jan. 17, 1906, defeating Paul Doumer. Among the chief events of his term of office, which ended Jan. 7, 1913, were his visit to England in May, 1908, and the cementing of the Franco-Russian alliance. Pron. Falli-yare.

**Falling Sickness.** Old name for the disease now generally known as epilepsy (*q.v.*).

**Falling Stars.** Name given of old to meteorites. There are many references in literature, for example, Shakespeare's Beatrice declared "A star danced, and I was born." See Meteors.

**Fallopian Tubes.** Two tubes, one on each side of the uterus or womb, which convey the ova or eggs from the ovary to the uterus. Each tube is about 4 ins. in length. The inner end opens into the uterus near its superior angle. The outer end opens into the peritoneal cavity, and terminates in an extremity in close relation to the ovary, and bearing a number of fimbriae or fringe-like processes.

**Fallopian** or **FALLOPIO**, GABRIELLO (1523–62). Italian physician and anatomist, discoverer of the functions of the Fallopian tubes. Born at Modena, he studied medicine at Ferrara and other centres, becoming professor of anatomy at Ferrara. Afterwards he held the chairs of anatomy, surgery, and botany at Padua university, where he died Oct. 9, 1562. He published in 1561 his *Observationes Anatomicae* at Venice, where his works, *Opera Genuina Omnia*, were published in 1584.

**Fallow.** Saxon word meaning reddish or buff-coloured, used to describe ploughed land without a crop. Before root-crops were known and artificial manures in use, land exhausted by the growth of crops was given a rest, and was then said to be in bare fallow. Proper tillage of a fallow cleans the soil thoroughly from weeds, while the air and water circulating in the soil gradually convert dormant plant-food into soluble and available forms.

Land does not require a rest, as was formerly supposed, and the practice of allowing it to become overgrown with natural vegetation was a great mistake. On land which is very heavy, or full of weeds, bare fallowing is still practised; but in modern agriculture fallowing is replaced by the growth of root-crops or kale or rape, which do not interfere with cleaning operations, and allow of replenishment of plant-food by suitable manuring. When the crop is fed off on the land, with an added ration of cake, the resulting manure keeps up the supply of plant-food in the soil. Half, bastard, or rag fallowing consists in letting a seed crop persist for two years, cultivation following when the hay has been carried, or the best of the keep eaten off by stock. *See Agriculture.*

**Fallow Deer.** Small group of deer, characterised by having antlers round at the base and palmated above. They have small heads, rather large ears, and comparatively long tails, and usually stand about 3 ft. high. The hair is generally fawn colour, more or less dappled with white, but some local races lack the white spots, and are of such dark brown as to approach black. This is the deer generally kept in parks in Great Britain, and it occurs in a wild state in Epping Forest. It was probably introduced into Great Britain from the Mediterranean district at some early period. The huge extinct deer of Ireland, often erroneously called the Irish elk, was a gigantic species of fallow deer, and stood 6 ft. high at the shoulder, with antlers spanning over 11 ft. Its remains are also found in England and Scotland. *See Deer*; also illus. p. 472.

**Fallowfield.** Suburb of Manchester. On the S. of the city, it is mainly a residential district. It has a station on the G.C. Rly., and is also connected with the city proper by tramways. Pop. of dist. 3,316. *See Manchester.*

**Fall River.** City of Massachusetts, U.S.A., in Bristol co. On Mount Hope Bay, 50 m. S.S.W. of Boston, it is served by the New

York, New Haven, and Hartford Rly., and by an inter-urban electric system. It has a commodious harbour, is among the leading producers of cotton goods in the country, and manufactures calico, woollens, boots and shoes, hats, pianos, and machinery. There are also brass and iron foundries, and granite is largely worked in the neighbourhood. Abundant water-power is obtained from Fall River. Among the principal buildings are the custom-house and the state armoury. Forming part of Freetown down to 1803, it was called Troy until 1834, and received a city charter in 1854. Pop. 129,630.

**Falmouth.** Mun. bor., seaport and market town of Cornwall, England. It stands at the mouth of the Fal, 11½ m. by rly. S. of Truro, on a branch of the G.W.R. It is an important port of call, and has an excellent harbour, accessible to the largest vessels.



Falmouth arms

The two dry docks have been recently deepened by 4 ft., and pneumatic plant and electric welding apparatus installed, and large vessels can now put in for repairs. A new dry dock to accommodate vessels of length 720 ft., beam 90 ft., and draught 28 ft., was under construction in 1920. Shipbuilding and engineering, brewing and rope-making are prominent industries, and there is a considerable pilchard fishery. Falmouth exports tin. Its mild and equable climate and the scenery of the Fal valley make it a favourite watering-place. Here are the headquarters of the Royal Cornwall Yacht Club. The corporation maintains the markets, library and pleasure grounds. Great improvements have been made along the sea front, a sub-tropical garden having been laid out and a concert pavilion erected. Market day, Sat. Pop. (1921) 13,318.



Falmouth. Prince of Wales pier, opened in 1905, from which all steamers start

**Falmouth.** British light cruiser. She was torpedoed in the North Sea, Aug. 19, 1916. Belonging to the Weymouth type, and completed in 1911, she was 430 ft. long, 48½ ft. in beam, displaced 5,250 tons, and had engines of 23,500 h.p., giving a speed of 25 knots. She carried eight 6-in. and nine smaller guns.

**Falmouth, VISCOUNT.** British title borne by the family of Boscawen since 1720. The family is an old Cornish one, members of it having possessed Boscawen-Rose in the time of King John. Several Boscawens were M.P.'s for Cornwall, and in 1720 one of these, Hugh, was made a viscount. The title passed to his son and grandson and came in 1808 to Edward Boscawen, who in 1821 was made earl of Falmouth. When his son, the 2nd earl, died in 1852 the earldom became extinct, but the viscounty passed to a cousin, Evelyn. The latter's son, Evelyn, the 7th viscount, succeeded in 1889. He inherited from his mother in 1891 the ancient barony of Le Despencer and saw service in Egypt, 1880-85. In 1918 his son, Evelyn Hugh, became the 8th viscount. The family seat is Tregothnan, Truro.

**False Acacia** (*Robinia pseud-acacia*) OR LOCUST-TREE. Tree of the natural order Leguminosae,



False Acacia. Flower of the Locust-tree of N. America

native of N. America. It attains a height of 60 ft. to 80 ft. Its long, narrow leaves are broken up into 5-12 pairs of oval leaflets, and at the base of the leafstalk are two stipules which, on the non-flowering branches, become hardened into persistent spines. The fragrant flowers are produced in long, pendant sprays, like those of the laburnum, but are white instead of yellow. The seed-pods, too, are like



those of laburnum, but dark red in colour. The wood, though hard and durable, is liable to crack and is little used.

**False Antiquities.** Relics of the human past fraudulently forged, deliberately falsified, or erroneously attributed. The chief motives for their production are desire for gain and love of mystification.

The production of copies of genuine originals (coins, scarabs, paintings, porcelain) with a fraudulent intention is on a different plane. To a special category should be referred such literary deceptions as Bertram's fabrication (see Bertram, Charles Julius). Among famous modern forgeries are those of Shapira, a Pole, who sold a collection of spurious Moabite pottery to the Prussian government for £3,000, and afterwards offered the British Museum an alleged Mosaic MS. on leather. The Louvre Museum, Paris, acquired, in 1896, for £8,000, a gold tiara inscribed to a Scythian king, Saitarpharnes, which was found in 1903 to have been produced in Odessa by a Russian workman. In 1908 scarabs, purporting to record the circumnavigation of Africa under Pharaoh-necho, led to a conviction for fraud.

Prehistoric remains have furnished the forger with a profitable field. Fifty years ago chipped flints were openly manufactured by Edward Simpson (Flint Jack). Meillet of Poitiers published grotesque palaeolithic engravings in 1864.

Experts alone themselves sometimes by self-deception to attribute antiquity to modern relics, as when W. Bode acquired for Berlin in 1909 a wax bust made by an English sculptor, Lucas, and claimed it as the work of Leonardo da Vinci. See Literary Forgery; consult also Archaeology and False Antiquities, R. Munro, 1905; Forged Egyptian Antiquities, T. G. Wakeling, 1912.

**False Bay.** Inlet of the Atlantic Ocean, on the E. side of the Cape of Good Hope. The Cape of Good Hope and Hangklip Cape form the W. and E. extremities. Its length is 22 m. and its breadth 23 m. It was much used as a rendezvous for the Cape Squadron.

**False Point.** Cape and port of India. In the Cuttack District of Bengal, the cape is on the Mahanadi estuary, and is situated in 20° 20' N. and 86° 47' E. It is so called from being mistaken by seamen for Point Palmyras, 1° farther N. The port (opened 1860) has the best harbour between Bombay and Calcutta, and has canal communication with the interior of Orissa.

**False Pretences.** Term used in English law. It is a misdemeanour at common law to obtain or at-

tempt to obtain money or property by false pretences. The pretence must be false; it must be a statement of fact and not merely of intention; the person making it must know it to be false; by it the other person must be induced to part with the money, etc., and it must be done with intent to defraud. The pretence may be made otherwise than by words—e.g. a man in an undergraduate's cap and gown enters a shop in Oxford and obtains goods on credit. He has represented himself to be an undergraduate of the university. A person enters a restaurant, and orders a meal value five shillings. He has represented that he has five shillings wherewith to pay. It must be distinguished from larceny by trick. See Larceny.

**False Relation.** In harmony, one note following a different note of the same letter in another part, e.g. C sharp in alto followed by C natural in tenor, in successive chords. It is not permitted in strict harmony, but is condoned if, using the above example, both parts have C sharp in the first chord.

**Falsetto** (Ital.). Term applied to a kind of high voice of men, who discard the natural pitch of speaking and singing in order to cultivate extreme high notes and sing an alto part. It is produced, according to some, by allowing only a short length and a portion of the breadth of the vocal cords to vibrate, instead of the whole. There are a few natural adult alto voices, but most choir singers who adopt this part are baritones or basses, using their falsetto range. See Voice.

**Falsification.** Term meaning making false. It is chiefly used in connexion with accounts. The falsification of accounts by a clerk or servant with intent to defraud is by English law a misdemeanour punishable by penal servitude. It is also an offence to falsify the service certificate of a seaman or soldier. Some forms of falsification come under the heading of forgery (q.v.).

**Falstaff.** Comic character in Shakespeare's King Henry IV and The Merry Wives of Windsor. In the former the fat knight is the boon companion of Prince Hal; in the latter he is the dupe of Mistress Ford and Mistress Page, whom he courts with the intention of making money out of them. His boastfulness, cozening, drunkenness, and cowardice are balanced by his wit and gaiety. See illus. p. 58.

**Falster.** Island of Denmark. It lies to the S. of Zealand, between Laaland on the E. and Moen on the W., separated from them by narrow straits. It is 28 m. from N. to S., with a maximum width of 15 m. The surface is fairly level,

but low and marshy near the coast, where malaria is endemic. The island is fertile and cultivated; stock-raising, dairy farming, and agriculture are the principal occupations. Sugar-beet and fruit are the chief crops. The largest towns are Nykjøbing and Stubbekjøbing, connected by rly. Area, 183 sq. m. Pop. 34,436.

**Faluns** (Fr.). Series of loose, sandy shell-beds, of Miocene age. They occur in the Touraine area of the S.W. part of France. Of marine, shallow-water origin, they often contain numerous fossils.

**Fama Clamosa** (Lat., crying report). Term used in Scottish Church law for any public scandal against a minister with which the authorities find it necessary to deal. The charge must be maintained by some responsible person who is prepared to prove it, or it must be a matter of such notoriety that no special complainant is necessary before it can claim official notice.

**Famagusta** (Lat. *Fama Augusta*). Seaport of Cyprus. It stands on the E. coast, 3 m. S. of ancient Salamis. The cathedral of S. Nicolas and a castle are notable features of the town. The harbour improvements were finished in 1906, and a narrow gauge rly. connects the town with Nicosia and Evrykhou (76 m.). Agriculture is the chief occupation, and the town is noted for its pomegranates. The original Roman walls were strengthened by the Genoese and Venetians, and are still fairly well preserved. Here, in 1191, Guy de Lusignan (q.v.) was crowned king of Cyprus by Richard I. The town flourished under Venetian rule (1487–1571), but later was taken by the Turks, when its prosperity began to decline. An earthquake in 1735 destroyed it. Pop., including the village of Varashia, 5,327.

**Famars.** Village of France, in the dept. of Nord. It is 3 m. S. of Valenciennes and was captured on Oct. 26, 1918, by troops of the 51st Highland division in the fight for Valenciennes. See Sambre, Battle of the; Selle, Battle of the.

**Famennian.** Uppermost stage of the Devonian system of stratified rocks. It is well developed in Belgium and northern France, where it consists of fossiliferous shales and sandstones, and in Rhineland, where limestones also are developed. Beds of slate near Ashburton and the Petherwin beds near Dartmoor belong to this stage. The name is taken from the slates of Famenne (Belgium).

**Familiar** (Lat. *familiaris*). In the Roman Catholic Church, a person who belongs to the household of a pope or bishop. He must at

least reside in the same diocese. The office became at one time an easy ladder to ordination and preferment. Consequently, the council of Trent decreed that a familiar could not be ordained by his bishop unless he belonged to the same diocese and had lived with him three years. Familiars of the Holy Office were officials of the Inquisition charged with the duty of arresting and imprisoning persons suspected of heresy or other offences against the spiritual authority. The name is explained by reference to their admission into the confidence of the Holy Office, as members of the family. (See Inquisition.)

Familiar was also the term applied to the spirit supposed to be in the service of necromancers and witches, incarnate sometimes in the form of a black cat or other animal. In this instance the idea was derived from the universal belief in a daemon, tutelary genius, or guardian angel associated with an individual from the moment of birth. See Demonology.

**Famille Jaune** (Fr.). Much of the finest old Chinese pottery is classified into family coloured groups, according to the predominating tints used. The most esteemed are the *famille rose*, *noire*, *jaune*, and *verte* (rose, black, yellow, green). See Pottery.

**Family** (Lat. *familia*). Group comprising father and mother, with their offspring. The unit of human society, its roots are traceable in the primeval life of mankind.

The first modern attempt to elucidate the origin of family life was Maine's patriarchal theory (1861). Based on Roman models, it assumed that the primitive father possessed uncontrolled power, the *patria potestas*, over his household. This view was impugned by MacLennan (1865), who postulated a primeval promiscuity, out of which emerged matriarchy, attributed to uncertain paternity; and exogamy, due to the theoretic kinship of the maternal clan; while communal marriage ultimately broke up into polyandry and polygyny. Working on similar material Lewis Morgan (1870) observed that in primitive communities it was more customary to denote kinship by "classificatory" than by "descriptive" terms. The main classes were five in number, a man using the same words for all persons within the clan of the generations of his grandparents, parents, brothers, children, and grandchildren respectively. These systems were hailed as further evidence of a stage of communal marriage preceding the growth of family groups.

Westermarck (1891) reverted to Darwin's view (1871) that the family was from the beginning based upon the supremacy of the individual father. When the "matrimonial classes" of the Australian aborigines, based on the totem, were studied by Spencer and Gillen, Howitt, and others, they were held to point to a primitive form of group-marriage. Subsequently Atkinson and Lang (1903) suggested that the prohibition of marriage within an incest-group—whence exogamy sprang—was due to the jealousy of the sire. The theory of promiscuity is inconsistent with the evidence; the widespread variants of the normal family are explicable on other grounds.

In polygynous societies the family is composed of sub-families, which under the system of concubinage tend to become subordinate to that of the chief wife. The closer social relationship of the mother with her own children obscures the paternal status; one outcome of this is the toleration of union with the half-sister, e.g. Abraham and Sarah.

The matriarchal system, imposing rights and duties towards the child, first upon the kinship group, and afterwards, as their representative, upon the mother's brother, is a widespread social device for securing the observance of tribal law. It may be reasonably attributed to the beginnings of agriculture at the end of the neolithic age, having been found in Europe by the Aryan-speaking peoples who spread westward, bringing new conceptions of father-right that lay at the base of patriarchal society. This view is confirmed by the matriarchy of early Egypt, and by the fact that patriarchy was well established at the dawn of Semitic history, which antedated the Aryan family.

In aboriginal America, where social organizations were developed on the neolithic foundation brought from Eurasia, the family—in the sense of the homestead or "house-fire"—is traceable at every cultural level. See Kinship; Marriage; Society.

**Family.** In zoological classification, term used for a group of genera which resemble one another, but are not marked by such important distinctive features as to justify making them into an order. For example, the domestic dog belongs to the genus *Canis*, which, with three other living genera and several extinct ones, is included in the family Canidae, or dog-like mammals; and this family forms one of the groups of the order Carnivora, or flesh-eating mammals.

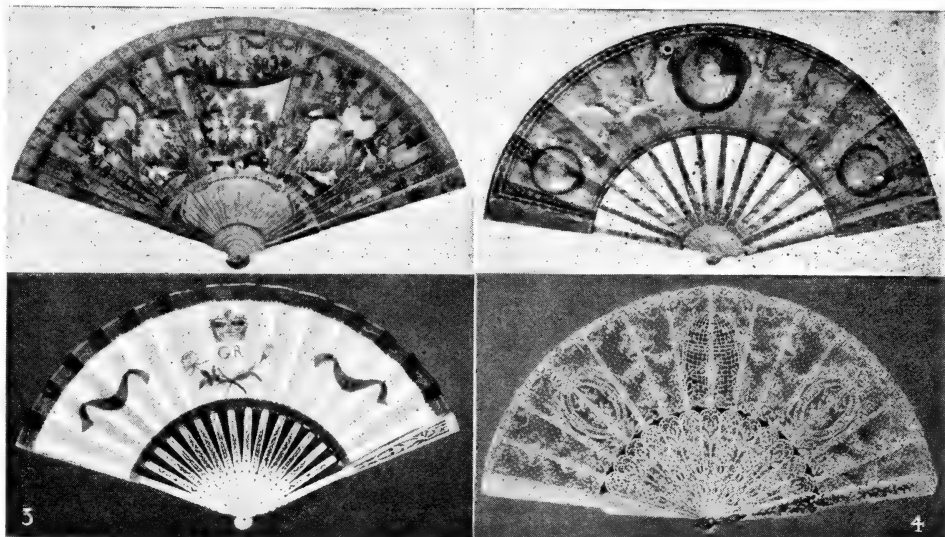
**Family Compact.** Arrangements made in the 18th century between the kings of France and Spain for the maintenance of an alliance between them, the Bourbons being the family then ruling over both countries. There were three of these compacts. On Nov. 7, 1733, France and Spain signed a secret treaty directed against Austria, with whom war quickly followed. In Oct., 1743, this alliance was renewed in a new family compact, directed mainly against Britain, with whom Spain, but not France, was then at war. War with France quickly followed. A third was made in 1761, when the Seven Years' War was raging. By this Spain entered the war.

The term family compact was applied to the domination of Upper Canada or Ontario, by a narrow circle of men, attached to England and the English church, in the early 19th century.

**Family Herald**, THE. London weekly journal of useful information and amusement, "interesting to all; offensive to none," founded in Dec., 1842, and the first periodical to be produced entirely by machinery. Until May, 1843, it was issued as a broadsheet, when the patent machinery was given up. The Rev. James E. Smith, M.A., the universalist, was its first editor. See "Shepherd" Smith the Universalist, W. Anderson Smith, 1892.

**Family of Love** or **FAMILISTS**. Religious sect, founded by Henry Niclaes, or Nicholas (c. 1502–80). Influenced by the mystical teachings of David Joris (1501–56), he claimed to be a recipient of divine revelations. The sect made its way to England in the reign of Edward VI, and had a few scattered followers. They taught that no one outside their sect could have a true knowledge of God; gave all the chief doctrines of Christianity a purely allegorical interpretation; and were extreme antinomians in practice as well as in theory. They became extinct about the middle of the 17th century.

**Famine** (Lat. *fames*, hunger). Period of want or scarcity of food supplies, usually confined to a more or less restricted locality. Its chief primary cause is deficiency of rainfall, but floods, frosts, storms, visitations of insects or other pests, inadequate agricultural methods, ill-directed labour, deficient transport, and the ravages of war are contributory causes. Neglect in the storage of food frequently brings about famine among primitive peoples, but it is sometimes to be accounted for by less obvious reasons, such as wholesale deforestation, which gives rise to local



Fan. Examples of delicate and artistic work. 1. Richly painted gift fan, decorated in Vernis Martin lacquer, period of Louis XIV, formerly belonging to Queen Victoria. 2. Silk fan with medallions painted by F. Boucher (1703-70). The ivory stick is carved and enriched with gold. 3. English fan made to commemorate the recovery from illness of George III in 1789, now in the British Museum. 4. White lace fan mounted on mother-of-pearl, formerly belonging to the Empress Eugénie

conditions of drought, and the dependence of a race upon one kind of food, as maize in S. America, rice in China, or the potato in Ireland.

Although scarcity is only partially preventable, the careful organization and governmental supervision of agricultural production in most parts of Europe and America has virtually freed civilization from the dread of starvation in normal circumstances. But all the foresight and accumulated experience of man is by no means equal to combating the conditions of serious dearth which follow prolonged hostilities. During and after the Great War of 1914-18 famine spread widely throughout Europe, especially in Russia, Germany, Austria, the Balkans, Czecho-Slovakia, and certain parts of France and Belgium.

The greatest recorded famines occurred at an early period in history, when the world was entirely dependent upon local and circumscribed supplies. In 439 B.C. Rome was visited by a famine so severe that thousands cast themselves into the Tiber. In Egypt famine lasted, A.D. 1067-72, while in 1005 Saxon England, and eleven years later the whole of Europe, experienced a prolonged period of terrible dearth. Another great European famine occurred in 1162, driving the population in many countries to cannibalism and brigandage. Ireland has frequently suffered from periods of scarcity, especially severe visitations occurring in 1491,

1822, and from 1846-47, when the potato crop failed with consequences of the most disastrous kind, thousands perishing from the "famine fever" which followed. In the period of dearth which followed the Thirty Years' War in Germany multitudes perished from hunger.

Chiefly through its liability to conditions of drought, the East has been peculiarly susceptible to famine. In 1877, 1888, and again in 1920, N. China suffered from appalling famine. India has, perhaps, more than any other country experienced frequent dearth over widespread localities. Native records speak of disastrous famines in 450, 941, 1022, 1033, 1052-60, 1344-45, 1396-1407, 1631, 1769-70, when 3,000,000 people perished; 1782-84 and 1790-92. Later ones were in 1866, when over a million natives perished; 1869, when 1,500,000 died; 1877, 1897, and in 1899-1900, when the loss of life was estimated at 1,000,000.

**Famine Fever.** Popular name for relapsing fever (*q.v.*).

**Fampoux.** Village of France, in the dept. of Pas-de-Calais. It lies slightly N. of the river Scarpe, 5 m. E. of Arras. It was stormed by the British, April 10, 1917. Severe fighting took place here in April, 1918, and at the end of Aug. in the same year the British in their great offensive advanced E. of it. See Arras, Battles of.

**Fåmund or Faemund.** Lake of Norway, in Hedemarken, near the

Swedish border. It lies in a mountainous district, at an alt. of 2,199 ft., 85 m. S.S.E. of Trondhjem. It is 37 m. long from N. to S., with a maximum width of 5 m.

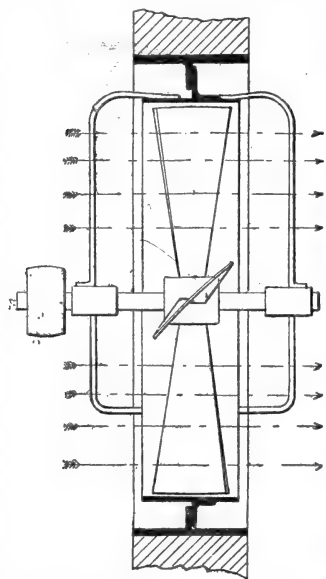
**Fan** (Lat. *vannus*). Implement for agitating the air, especially used for cooling the face. Fans have been used from the earliest ages in hot countries, and in their primitive form they were made of feathers stuck into long handles. In Europe they came into general use in the 16th century, and were known as early as the 14th century, having probably been introduced from the East. They were usually made of feathers, straw, silk, etc., with handles of ivory, gold, silver, and wood, often richly carved and encrusted with precious stones.

The folding fan, an invention of the Japanese, was adopted in Europe towards the end of the 16th century. Fan painting became an art in the middle of the 17th century, and printed fans, illustrating pastoral scenes, and reference to politics, etc., also became the vogue. Fans have always played a symbolic part in ceremonial, and even now are used in the East, and are carried on state occasions in papal processions in Rome. See Punkha; consult also Fans and Fan Leaves, collected and described by Lady Charlotte Schreiber (English), 1888 and (Foreign) 1890; History of the Fan, G. W. Rhead, 1910.

**FAN PAINTING.** Both folding and non-folding fans have been the object of elaborate decoration.

Antoine Watteau, Nicolas Lancret, Jean Baptiste, Joseph Pater, François Boucher, and other 18th-century French artists produced fans of incomparable beauty. Among English artists who have practised the art the most notable was Charles Conder (1868-1909), who in this genre was no mean rival of Watteau himself.

**Fan.** In industry, a revolving wheel to move air or gas. To an axle, usually horizontal, is attached a series of vanes or blades, which may be flat or curved, the whole being enclosed in a casing of volute shape having a central opening for admission of the air or gas, and an opening in the circumference for the delivery of the air.



Fan. Propeller, wing, or tunnel type for moving large volumes of air at low pressure for ventilating, drying, or removing noxious fumes

When air enters it is caught by the vanes, whirled round with them, and thrown by centrifugal action to the circumference while it acquires the velocity of the revolving vanes. This combined action carries the air out through the discharge opening with a velocity and at a pressure determined by the size and speed of the vanes. The fan-wheel may be only a few inches in diameter, or it may be 20 or 30 ft., as in the case of mine and tunnel ventilating fans.

The volume of air moved by a large fan may amount to 700,000 cubic ft. per minute. Fans are used largely for metallurgical furnaces where only a moderate pressure of air is required, as in the black-

smith's fire. The type of fan shown below is known as the centrifugal; another form, with vanes set more or less spirally on the axle, the movement of the air being parallel to the axis, is the propeller or tunnel type. *See Blowing Engine.*

**Fanariotes** OR PHANARIOTES. Name given to the aristocratic



Fanfare sounded by state trumpeters

Greek class in Constantinople prominent during the 18th century as governors of the E. European provinces of the Porte. The word is derived from Fanar, the Turkish name for that quarter of Constantinople which was inhabited by Greek residents. Members of this class, by means of a recognized

people to triple time. A characteristic rhythm of the music is:

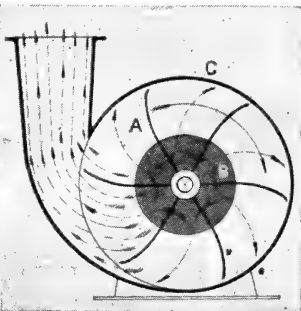
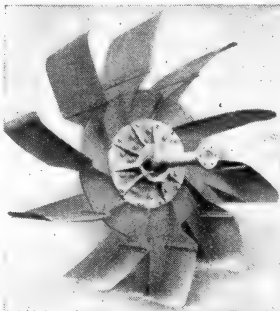


*See Castanets.*

**Fanfare** (Fr.) OR FLOURISH. Properly, a short passage for trumpets in unison, performed on state

occasions. That used at the opening of Parliament dates from the reign of Charles II. Some composers have used fanfares in opera, notably Beethoven, Spontini, Ambroise Thomas, and Wagner.

**Fang.** Specialised teeth in poisonous snakes by which the venom is conveyed into the wound



Fan. Standard centrifugal ventilating fan and, right, sectional diagram. A, fan-wheel; B, air-inlet; C, casing; course of air indicated by arrows

system of bribery, obtained nomination as rulers of principalities such as Wallachia, and set themselves to recoup their expenses by unscrupulous taxation. The system of appointing fanariotes was dropped in 1821.

**Fancy.** Shortened form of phantasy. It means primarily any creation of the imagination. From this it came to be used for an inclination or liking, and thus we speak of fancying anything and have the phrase bird fancier. The fancy is sometimes applied to the adherents of pugilism, while De Quincey uses it for lovers of rare books. Fancy goods as a trade term refers to the lighter and supplementary forms of women's dress, such as ribbons, gloves, veilings, etc., also to handbags and articles used to ornament rooms, such as silver vases, picture frames, and the like.

**Fandango.** Name of a Spanish dance. It is usually accompanied by castanets to reinforce the strong rhythm, as well as by melodic instruments. It is danced by two

caused by the bite. In the viper tribe the fangs are channelled, so that the venom, exuding from the tip of the tooth, is conveyed to the deepest part of the wound. In certain other snakes the fang is simply grooved, and most of the venom merely reaches the surface. The fangs may be either at the front of the jaw or at the back, and in the latter case the bite is seldom dangerous to man, though it may be fatal to small animals. The fangs usually fold back against the jaw when not in use. The venom is forced through the fang partly by constriction of the venom bag, partly by pressure on the base of the fang in the act of biting.

**Fang** OR FANGWE. Negro tribe of the French Gabon colony and Spanish Guinea. Their debased Bantu speech, including the Maké dialect, is spoken within the coast-highland region bounded by the Ogowe, Ivindo, and Campos rivers. Well-built, slim, 5 ft. 7 in. in height, bronze-coloured, bearded, intelligent, they display Hamitic ele-

ments, having migrated due W. from the valleys of the N. Congo affluents about 1850, driving the weaker aboriginal negroes before them. They are hunters and fishers, using cross-bows and throwing-knives, and are adept potters and ironworkers. The men wear bark waistcloths, the women grass girdles.

**Fannmakers' Company.** London city livery company, incorporated April 19, 1709.



Fannmakers' Company arms

Its offices are at 19, Great Winchester St., E.C.

**Fannich.** Loch or lake of Ross and Cromarty, Scotland. Near the centre of the county, it is drained by Fannich Water (6½ m. long). The Fannich Mts. (Sgurr Mor, 3,637 ft.) and Fannich Forest (20,000 acres) lie to the N. of the lake, which is 6½ m. long and about 1 m. broad.

**Fanning.** Coral island in the Pacific Ocean, lying due S. of the Hawaiian Islands in lat. 3° 50' N. and long. 159° 20' W. Administratively it is annexed to the Gilbert and Ellice Islands Colony, and is a station of the submarine cable between Australia and Vancouver. It exports mother-of-pearl, and there are guano deposits. Area, 15 sq m. Pop. 150. The name is also applied to a neighbouring group, viz. Christmas, Jarvis, Washington, and Palmyra, the last being claimed by the U.S.A. The total land area is about 260 sq. m. They were discovered in 1798 by Edmund Fanning.

**Fanning, EDMUND (1737-1818).** American soldier. Born at Long Island, New York, he graduated at Yale in 1757. He became a lawyer in N. Carolina, and occupied various posts in the local government, where his malpractices and subservience to the home government earned for him unpopularity. In 1774 he was made surveyor-general, and in 1777 he raised a regiment to combat the revolution. Colonel in the British army in 1782 and governor of Prince Edward Island in 1787, he became major-general in 1794 and general in 1808. In those years he did some voyaging in the Pacific. He died in London, Feb. 28, 1818.

**Fanning, JOHN THOMAS (1837-1911).** American engineer. Born at Norwich, Conn., he was there educated. He became an engineer, but left his profession to serve the North in the Civil War. Returning to his work, he was for nearly fifty years one of the leading authorities on hydraulics, being concerned in

the construction of numerous water-works and similar undertakings in the U.S.A. He was consulting engineer to a large number of schemes for obtaining water and chief engineer of the water-power company at St. Anthony. His work, *A Treatise on Hydraulic and Water Supply Engineering*, 1877, was long the most authoritative American book on the subject.

**Fannius, GAIVS.** Roman analyst. He served in Africa, where he and Tiberius Gracchus were the first to mount the walls of Carthage 146 B.C., and in Spain 142. Through the influence of Gaius Gracchus he obtained the consulship 122, but when the former proposed to confer full citizenship upon the Latins, Fannius opposed him in a famous speech. Orator, advocate, and student of philosophy, Fannius was best known for his *Annales*, a history of Rome from the earliest days down to his own times. The work enjoyed a high reputation, and was used by Plutarch in his *Lives of the Gracchi*.

**Fanny's First Play.** Comedy by Bernard Shaw. It was first produced at The Little Theatre, April 19, 1911, where it ran for 624 performances, and afterwards at The Kingsway, Feb. 13, 1915.

**Fanø.** Island of Denmark. It lies off the S.W. coast of Jutland, and its N.E. point faces Esbjerg on the mainland. It is 11 m. long and from 2 m. to 3 m. broad. There are three small towns on the island: Fanø, a health resort on the W. coast; Nordby, on the N.E. coast; and Sønderho, in the S. Fishing is the main industry. Area, 20 sq. m. Pop. 3,000.

**Fano** (anc. *Fanum Fortunae*). City and seaside resort of Italy, in the prov. of Pesaro e Urbino. It stands on the Adriatic, 8 m. by rly. S.E. of Pesaro. It is enclosed by medieval walls, with bastions facing the sea. Its cathedral and churches contain many pictures by old masters. The town possesses a fine theatre, formerly a palace, the remains of a triumphal arch of Augustus, and a palace of the Malatesta. Fishing is the chief occupation of the inhabitants, and there is trade in corn, oil, and silk. The old harbour has silted up, and shipping is now conducted through a canal to the sea. Here, in 1514, the first printing press with Arabic type was set up. The Roman city owed its origin to a temple of Fortune commemorating the defeat of Hasdrubal on the Metaurus. Pop. 26,928.

**Fan-palm** (*Livistona*). Genus of trees of the natural order Palmae. They have large, fan-shaped, plaited leaves, and are natives of Eastern Asia, Malaya, and Austral-



Fann-palm. Foliage of *Livistona chinensis* asia. The best-known species are *L. australis*, from Eastern Australia, and *L. chinensis*, from S. China.

**Fanshawe, SIR EDWARD ARTHUR** (b. 1859). British soldier. Born April 4, 1859, and educated at



Sir E. Fanshawe, British soldier  
After Francis Dodd

Winchester, in 1878 he entered the Royal Artillery, serving in the Afghan War of 1878-80 and in Egypt in 1885. In 1903 he became a lieutenant-colonel and in 1909 was put in charge of the artillery of the 6th division. When the Great War broke out he was commanding the artillery of a Territorial division, but in Sept., 1914, he went to France at the head of a regular brigade, the 6th. In 1915 he took command of the cavalry corps. In 1918 he commanded the 5th corps, and in 1917 was knighted.

**Fanshawe, SIR RICHARD (1608-66).** English diplomatist and writer. Born at Ware Park, Hertford-



Sir R. Fanshawe, English diplomatist  
After Harding

shire, after travelling in France and Spain, he was appointed in 1635 secretary to the embassy at Madrid. About 1644 he became secretary to the prince of Wales and in 1648 was made treasurer of the navy under Prince Rupert. He was created a baronet in 1650. After the Restoration he sat in Parliament for Cambridge University from 1661 until his death, and undertook various missions to Spain and Portugal. He translated the *Lusiad* of Camoens, 1653, and Guarini's *Pastor Fido*, 1647. He died at Madrid, June 26, 1666.

**Fan Tan.** Chinese gambling game. The implements for playing consist of a bowl full of beans or counters and an oblong card, placed on a table, the corners of which are numbered, or assumed to be numbered, from 1 to 4: the lower right hand corner being 1.



the top right hand corner 2, the top and bottom left hand corners 3 and 4 respectively. Or, in place of the card a corresponding oblong space is chalked upon the table. Bets are made upon these separate corners, which are decided by the banker taking a handful of beans or counters, and dividing them into fours; the number of odd pieces over deciding the winning number. If there is no remainder, No. 4 wins.

An American variety is played with an ordinary full pack of cards, by any number of players up to eight. One card is dealt to each player, the remainder forming the stock and being placed face downwards upon the table. Each player contributes a fixed stake. Unless an ace has been dealt to him, each player draws a card from the stock in rotation until he obtains an ace; each time he fails to do so, paying an ante or stake, which continues until all four are drawn by one or other of the players. The aces are laid side by side as they are turned up, and the different suits are built upon them, from ace to king. The player who first gets rid of all his cards takes the pool. *See Gaming.*

**Fantasia** (Ital.). Musical composition in which strict form is not exacted, and everything is left to the "phantasy" of the composer. In different centuries and countries, this term and similar ones—fancy, fantasie, rhapsody, phantasy, etc.—have denoted greatly varying types of music, but all possessing the idea of freedom from the more formal designs of their periods and surroundings. These terms have covered alike the naïve old contrapuntal string trios of Orlando Gibbons (early 17th cent.), the monumental organ fantasias of J. S. Bach (early 18th cent.), and much worthless pianoforte music of the 19th century.

**Fanti** (cabbage-eaters). Negro people in the Gold Coast colony, W. Africa. They are allied to the Ashanti (*q.v.*), and their number is estimated at 1,000,000. They are muscular, round-headed, chocolate-hued, of medium stature, and live in small village-communities, and on the coast. Their tribal scars are three lines on each side of the jawbone. Their Tshi dialect is the dominant speech round Cape Coast Castle. Ceremonial cannibalism formerly prevailed among them.

**Fantin-Latour**, IGNACE HENRI JEAN THÉODORE (1836-1904). French painter. Born at Grenoble, Jan. 14, 1836, son of the painter Théodore Fantin-Latour, he studied under Boissaudran and at the Beaux Arts. He began to exhibit at the Salon in 1861, and obtained

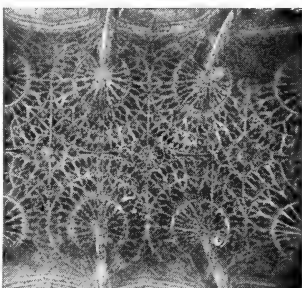
his first award in 1876. Under the naturalistic influence of Manet and Bastien-Lepage, he achieved a



**Fantin-Latour**,  
French painter  
*Self-portrait in Uffizi  
Gallery, Florence*

striking triumph with a portrait of the former; an even higher achievement is the portrait of Mr. and Mrs. Edwin Edwards, in the National Gallery, London. Simple and unaffected in arrangement, cool and reticent in colour, this picture shows an art refined and exquisitely delicate without departing from naturalistic principles. Fantin was known as an unsurpassed painter of flowers before his genius in portraiture was revealed; in the National Gallery is a study of roses by him. Among his other works may be cited *L'hommage à Delacroix* (Louvre), *Portrait de Mme. Fantin-Labori* (Luxembourg), *Portrait de l'artiste à 23 ans* (Grenoble), and *Le Toast*. He died at Buré, Orne, Aug. 28, 1904.

**Fan-Tracery**. In Perpendicular Gothic architecture, the rich tracery of a vault created by springing the stone ribs from their various points of support in such fashion that the effect is that of a spreading fan. There are finely developed examples in Henry VII's Chapel, Westminster Abbey, and in St. Stephen's cloister at Westminster Hall. *See Gothic Architecture.*



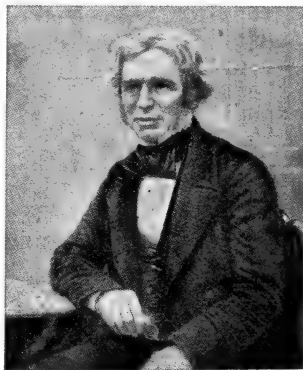
**Fan-Tracery** seen in the vaulting of  
Henry VII's Chapel, Westminster  
Abbey

**Fao**. Village of Mesopotamia. It lies on the right bank of the Shatt el Arab, about 3 m. from the Persian Gulf, and before the Great War was of some importance as a cable and telegraph station of the Indo-European Telegraph Co. The mud fort erected by the Turks was captured by the British, Nov. 7, 1914, at the beginning of the operations in Mesopotamia. The forti-

fications were afterwards strengthened by the British, who retained it as a sort of naval base throughout the war. Pop. 600.

**Farad**. Unit of electrical capacity of an electrical conductor. A capacity of one farad is that which would be raised to a difference of pressure of one volt by a charge of one coulomb. For practical purposes the farad is too large, and a smaller unit—the microfarad, one millionth of a farad, is employed. *See Capacity*; *Unit, Electrical.*

**Faraday**, MICHAEL (1791-1867). British chemist and physicist. The son of a blacksmith, he was



*Michael Faraday*

born at Newington Butts, London, Sept. 22, 1791. After a short apprenticeship with a bookbinder, he became assistant to Sir Humphry Davy at the Royal Institution. There he quickly showed remarkable ability as an acute observer and original experimenter. In 1813-15 he travelled with Sir Humphry Davy in Europe; ten years later he became director of the laboratory; and in 1833 he was made Fullerian professor of the Institution for life.

Faraday stands at the head of scientific observers of the 19th century, and his discoveries have left their indelible mark on the progress of mankind. To-day his pointers to the paths of investigation in electricity are still being followed, and results are being obtained in accordance with his brilliant predictions. Faraday's earliest work under Davy was concerned with chlorine, two new combinations of which he discovered. He followed this up with the liquefaction of a number of gases, and the discovery of new kinds of optical glass. The later discovery was destined to lead to one of his

most important investigations in electricity, that of magnetic rotatory polarisation in 1846.

In 1831 he made the discovery of magneto-electrical induction, the forerunner of the modern dynamo, and each succeeding year brought fresh discoveries. In 1833 he proved the identity of electricity from different sources; in 1834 came the discovery of equivalents in electro-chemical decomposition; in 1838 electro-static induction, followed the same year by the announcement of the relation between electric and magnetic forces; diamagnetism and the magnetic condition of all matter, 1849; atmospheric magnetism, 1851.

In 1835 Faraday was given a pension, and in 1858 a house at Hampton Court, where he died Aug. 25, 1867. Deeply religious, a member of the sect known as the Sandemanians, Faraday rigidly separated his religion from his science. In the latter, he was one of the most brilliant experimenters ever known, and to him must be given the credit for the solid foundation of electrical science as it is known to-day. *See* Lives by Tyndall, 5th ed. 1894; Bence Jones, 1870; J. H. Gladstone, 1872; S. P. Thompson, 1899.

**Faraday's Law.** Law discovered by Michael Faraday. In an electrolytic cell the amount of an ion liberated at an electrode is proportional to the strength of the current. An electrical current may thus be measured in terms of the quantity of an electrolyte which it decomposes. *See* Current; Electricity; Electrolysis.

**Faraday Society.** Society founded in 1903 in honour of Michael Faraday, to promote the study of electro-chemistry, electro-metallurgy, and kindred subjects. Among its presidents have been Lord Kelvin, Sir Oliver Lodge, Sir Robert Hadfield, and Sir Richard Glazebrook. Offices, 10 Essex St., London, W.C.

**Faradism** OR **FARADISATION.** Term for the use of an interrupted current of electricity in medicine. Faradism is useful in cases of paralysis, gout, rheumatism, and neurasthenia. *See* Electricity.

**Farce** (Fr. from Lat. *farvere*, to stuff). Dramatic piece of an essentially ridiculous character to which extravagant language, caricature, and ludicrous situations may all contribute. The modern farce is more closely connected with the ludicrous element that came to be grafted on to early morality plays, and in time came to be given in separate performances. In its modern sense it is defined by A. W. Ward as the

briefest sort of comic play in which a more unrestricted licence of fun is allowed, and a stronger demand made upon the sense of probability.

Modern farce may be said to have started with the plays of Samuel Foote, in the 18th century. In the 19th century the short farcical play as written by Poole, Maddison Morton, F. C. Burnand, and others was highly popular. The word originally meant an interpolation, like an actor's gag, hence a performance in which jests and humorous incidents predominated.

**Farcy** (Lat. *farctiminum*). Disease affecting horses. It is a form of glanders (*q.v.*), and as such must be notified to the local authorities.

**Fareham.** Market town, seaport, and urb. dist. of Hampshire, England. It stands on a creek off Portsmouth Harbour, 8 m. N.W. of Portsmouth and 76 m. S.W. of London, and is a junction on the L. & S.W. Rly. The chief building is S. Mary's Church, and near are the ruins of Porchester Castle. There is a trade in corn and coal. In medieval times Fareham was a prosperous port, but now it can only be reached by small vessels. It was also a borough, and at one time sent members to Parliament. Market day, Mon. Pop. 9,674.

**Farewell.** Cape of Greenland, at its southernmost point, in lat. 59° 50' N. It is on a small island off the coast, with an alt. of 1,000 ft. The ice drifting past it from the N.E. towards Davis Strait, in addition to the currents, makes it dangerous for navigators.

**Far from the Madding Crowd.** Novel by Thomas Hardy, first published in 1874. One of the earliest of his realistic novels of Wessex rustic life, it tells of the tragic relations of the woman farmer Bathsheba Everdene with three men, the middle-aged farmer whom she inflames by means of a thoughtless valentine, the worthless Sergeant Troy, whom she first marries, and the fine loyal Gabriel Oak in whose love she eventually finds repose.

**Fargo.** City of N. Dakota, U.S.A., the co. seat of Cass co. The largest city in the state, it stands on the Red River of the North at the head of steamship navigation, 240 m. N.W. of Minneapolis, and is served by the Chicago, Milwaukee & St. Paul and other rlys. It contains the state agricultural college, Fargo College, other educational institutions, and several parks. An extensive trade in grain is carried on, and machinery and farming implements are largely dealt in. The manufacturing interests include flour and knitting mills, foundries, and leather goods factories. Settled in 1871, it was

incorporated in 1875. A fire in 1893 caused damage estimated at £600,000. Pop. 17,875.

**Faridkot.** Sikh state of the Punjab, India. In the S. of Ferozepore district, its area is 642 sq. m. The ruling family belongs to the Sidhu-Barar clan of the Jats. The E. of the state is irrigated from the Sirhind canal. Pop. 130,294; 42 p.c. Sikhs, 29 p.c. Hindus, 29 p.c. Mahomedans.

**Faridpur.** District and town of Bengal, India, in the Dacca division. The name is derived from a Mahomedan saint, Farid Shah, whose shrine has been set up in the town. Of the total area of the district, 2,576 sq. m., more than three-quarters is under cultivation. Other crops are jute, the chief export, and pulses. Hand weaving is the principal industry. Pop. dist., 2,121,914; town, 13,131.

**Faridun.** Hero of Persian mythology. His story is told in the Sháh-Námeh of Firdusi (Eng. trans. A. Rogers, 1907). Faridun overcomes the dragon tyrant Zuhak and occupies the throne. He is said to have reigned justly for 500 years, and to have gone about the world doing good and planting cypresses and roses.

**Farina** (Lat., meal). Starchy preparation used for food or in the industrial arts. The food-products of cereal grains and pulses, and starchy stems, roots, and tubers, are collectively called farinaceous. As a synonym for meal or flour the word denotes in N. America white, granular maize meal, finer than hominy, used for puddings, and in S. America starchy breadstuffs with fibrous admixture derived from cassava.

The farina used for sizing cotton textiles is principally potato starch, comprising normally starch 82·70 p.c., cellulose and ash 0·58 p.c., and water 16·72 p.c. It yields a thicker paste, and owing to its sparse nitrogenous matter is less liable to mildew than any other starch. It is mixed with wheat flour and china clay for stiffening fabrics, and because of its purity is the chief source of British gum or dextrin. Fossil farina or rock-meal is a white crumbly form of calcium carbonate.

**Farina; A LEGEND OF COLOGNE.** One of George Meredith's shorter stories, first published in 1857. It is an extravagant medieval love romance, telling how it was that the famous scent, eau-de-Cologne, came to be associated with the name of Farina.

**Farinelli** (1705-82). Professional name of the Italian singer Carlo Broschi. Born at Naples, Jan. 24, 1705, Broschi was a pupil of Porpora, in whose opera, Eumene, he

made his first appearance in 1722. This made him famous, and procured him lucrative engagements in Vienna and London. In



**Farinelli,**  
Italian singer  
*From an engraving*

1736 he went to Madrid and became a favourite of Philip V. There he remained for 25 years, being loaded with honours and exercising almost regal powers. His last years were passed at Bologna, and he died July 15, 1782. The exceptional beauty and range of Farinelli's voice and his wonderful control over it made him one of the most remarkable singers who have ever lived, if not the greatest of all male soprano singers.

**Faringdon.** Market town of Berkshire, England, known also as Great Faringdon. A station on the G.W. Rly., it is 13 m. W. of Abingdon and 17 m. S.W. of Oxford. All Saints Church is a large building with brasses and other memorials; among other buildings are the market hall and Faringdon House. The agricultural centre for a large district, Faringdon has a trade in corn, cattle, etc. Market day, Tues. Pop. 3,079.

**Faringdon, ALEXANDER HENDERSON, 1ST BARON** (b. 1850). British business man and politician. A son of George Henderson of Langholm, Dumfries, he was born in London, Sept. 28, 1850. He became a stockbroker, and in time head of the firm of Greenwood & Co. Having joined the board of the Great Central Rly. in August, 1894, he became chairman of the line, May, 1899. In 1898 he was returned to Parliament as Unionist M.P. for West Staffordshire, but lost his seat in 1906. From 1913-16 Henderson was M.P. for St. George's, Hanover Square. In 1902 he was made a baronet and in 1916 a baron, taking his title from Faringdon, near where is his seat, Buscot Park.



**Alexander Henderson,**  
1st Baron Faringdon

**Farington, JOSEPH** (1747-1821). British artist and diarist. A prominent P.A. in his day, he is now chiefly noted for his voluminous diaries, which were acquired by The Morning Post early in 1922 and serialised in that journal. They

abound in anecdote and gossip, and most of the eminent men and women of his time figure in them. The diaries were published in book form in 1922.

**Farini, LUIGI CARLO** (1812-66). Italian statesman. Born at Russi, near Ravenna, Oct. 22, 1812, he



**Luigi Farini,**  
Italian statesman

early became an ardent nationalist, and in 1843 was banished from the papal states. On the election of Pius IX in 1846 he returned to Rome as secretary to the ministry of the interior, and later was appointed to the department of public health. On the declaration of the Roman Republic, 1849, he resigned, but, disappointed at the trend of Pius's policy, Farini went to Turin, and wrote his famous *Lo Stato Romano dal 1815 al 1850* in 1851. The same year he became minister of public instruction and an ardent supporter of Cavour, creating a deep impression by his letters to Gladstone on Italian problems. In 1859 Farini was sent as Piedmontese commissioner to Modena, became dictator of the duchy, and negotiated the transfer of Modena, Parma and Tuscany to Piedmont. Appointed minister of the interior, 1860, he became prime minister of the new kingdom of Italy, 1861-63, and died Aug. 1, 1866.

**Farjeon, BENJAMIN LEOPOLD** (1833-1903). British novelist. Born in London, of Jewish descent, he early migrated to Australia. He edited a newspaper at Dunedin, New Zealand, before returning to

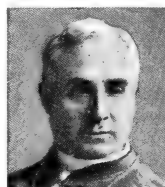
London, where in 1870 he published *Grif, A Story of Australian Life*, which was immediately successful. His



**Benjamin L. Farjeon,**  
British novelist  
*Elliott & Fry*

novels, realistic and sentimental, frequently dealt with mysteries and the detection of crime. Among the more notable were *London's Heart*, 1873; *The Duchess of Rosemary Lane*, 1876; *The House of White Shadows*, 1884; *Toilers of Babylon*, 1888; *Aaron the Jew*, 1894; and *The Mesmerists*, 1900. He died July 23, 1903.

**Farley, JOHN MURPHY** (b. 1842). Roman Catholic prelate. Born at Newton Hamilton, co. Armagh,



**John M. Farley,**  
Irish prelate

Ireland, April 20, 1842, he was educated in Monaghan, New York, and Rome. Ordained priest, June 11, 1870, he was assistant pastor of S. Peter's, New Brighton, Staten Island, 1870-72; secretary to Archbishop McCloskey, 1872-84; private chamberlain to Leo XIII, 1884; vicar-general, New York diocese, 1891, and domestic prelate to Leo XIII, 1892. Consecrated auxiliary bishop of New York, 1895, he became archbishop of New York, 1902, and was made a cardinal, Nov. 27, 1911. He wrote a *Life of Cardinal McCloskey*, 1900, and a *History of S. Patrick's Cathedral, N.Y.*, 1908.

## THE FARM: TYPES AND ORGANIZATION

J. C. Newsham, Principal, Monmouthshire Agricultural Inst.

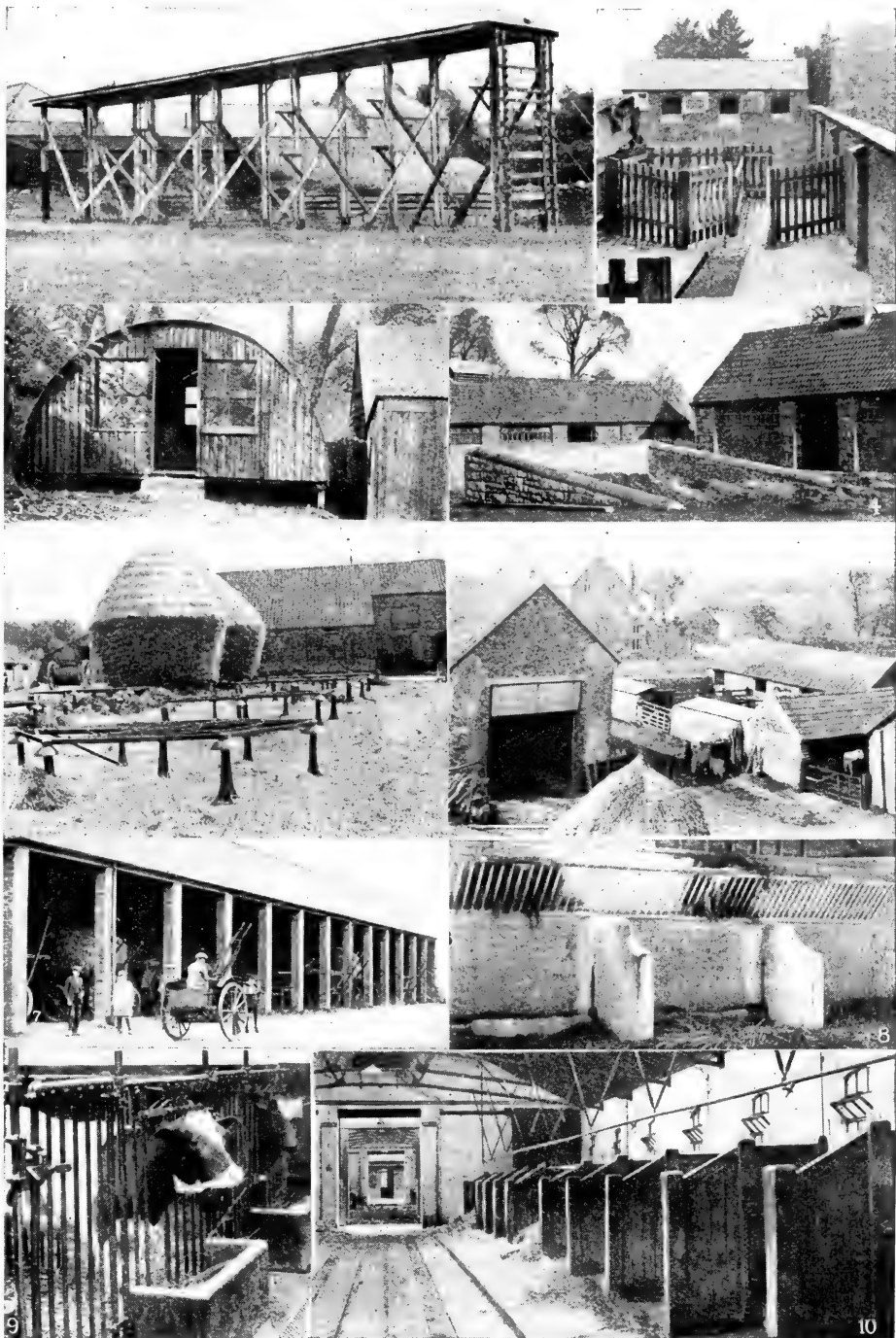
*This article describes the nature of the farm and its varieties, leaving the subject of its products to articles such as Agriculture; Cattle; Crops. See also Barley; Electro-Culture; Wheat.*

The word farm, when understood with etymological propriety, can designate only such land and buildings as are rented or held by a tenant, but in ordinary modern usage it may designate also the home farm of a large estate, or the small landed property of one who is himself both owner and farmer. The word itself originally comes from the late Lat. *firma*, a tribute or fixed payment.

The home farm on a large estate may be run on commercial lines to obtain the greatest profit, or merely to supply farm produce to the family and the immediate

dependents of the landowner, or as a model to exhibit all that is modern in the way of farm-buildings, and to demonstrate the best methods of husbandry suitable for the district. The modern tendency is to conduct home farms on purely commercial lines, leaving agricultural colleges, farm institutes, and schools of agriculture to experiment and demonstrate in all matters pertaining to the advancement of agriculture.

The Great War resulted in many small patches of pasture land in the British Islands being brought under the plough. Thus farms are



1. Drying racks for oats. 2. Dipping bath for sheep with draining pens beyond. 3. Old army hut used for storage. 4. Cowsheds and stone manure pit. 5. Stackyard with iron rick stands. 6. Farmhouse and adjacent

buildings. 7. Part of a 19-bay wagon shed. 8. Stalls in a cowshed. 9. Fittings used in pens where young stock are housed. 10. Another form of cowshed, with wooden stall partitions

# **FARM: FEATURES OF A MODERN BRITISH FARM EQUIPMENT**

*By courtesy of The Agricultural Gazette*

found varying in extent from a small arable holding little larger than a cottage allotment, with perhaps a barn to house the corn, to an estate of several thousands of acres of rich pasture and arable land, with a mansion, and houses for bailiffs, skilled workers, and farm labourers. In further contrast to the latter there are extensive areas of boggy land fit only for grazing cattle and sheep in summer; there is also mountainous land, restricted entirely to the breeding and feeding of sheep.

#### Types of Farms

The wide variation in the soil and climatic conditions in Great Britain and Ireland has a distinct influence upon the systems of farming adopted, and the farms are distributable into several widely different classes. Pastoral farms, such as those which exist throughout the west of England and in many parts of Ireland, are almost wholly utilised for the breeding of horses, cattle, and sheep. A pastoral farm may, of course, only comprise a sheep farm or "sheep walk" in the wild mountainous parts of Cumberland, or Scotland, or a cattle-rearing farm in rich pastoral counties like Devonshire. Or it may comprise a valley farm, where both dairy cattle and sheep of the heavier Down breeds flourish on the rich alluvial soils.

Distinct from these is the dairy farm for the production of milk and the manufacture of cheese and butter, where the by-products, including separated milk, butter-milk, and whey are utilised in calf-rearing and pig-feeding. In close proximity to cities, large provincial towns, or industrial centres, typical mixed farms are encountered where almost every form of husbandry is practised, from horse-breeding and corn-growing to catch-cropping and the breeding and feeding of poultry and rabbits; special attention is also given to the cultivation of market garden crops.

In many of the southern counties of England, e.g. Hampshire, two classes of farms, known as upland and woodland farms, are met with. The former comprise large areas of arable land, overlying the chalk in many cases, and these farms are almost entirely restricted to the breeding and fattening of the heavy breeds of sheep, such as the Hampshire Downs, Oxford Downs, and Suffolks, and crosses of these breeds. The system of rotation cropping on these shallow upland farms is intricate, and requires considerable local knowledge.

Woodland farms usually comprise one-third of their area as arable land, and as a rule the soil

consists of a heavy retentive clay loam overlying clay, difficult and expensive to cultivate, and strictly limited as regards the variety of crops which can be grown. There are few farms in England where large areas of corn are grown without the assistance of sheep as a means of manuring and consolidating light and shallow soils, although here and there grain is grown by the use of chemical manures, while the ploughing in of green crops comprises the only means of returning organic matter to the soil.

Although there is a tendency to divide large into smaller farms, many do not readily admit of this, more especially where the proportion of light to heavy soil is well balanced. Where there is an excessive quantity of heavy soil the farmer stands to lose considerably, because both men and horses are often idle during the winter months. A typical mixed farm of not more than 400 acres would appear to be as much as one man can manage if he is to give the amount of personal attention to it necessary for the successful conduct of his business, especially in view of the amount of detail in modern intensive farming.

In order successfully to control large areas either privately or on cooperative lines, good organization is essential, including the employment of skilled and experienced farm managers or bailiffs. The small mixed farm or holding is one of from 30 to 50 acres, on which the farmer, his wife and family may maintain themselves in reasonable comfort, simply through dint of hard work, economy, and thrift. In counties like Kent many families make quite comfortable livings by specialising in fruit-growing.

#### Modern Farm Buildings

The planning and erection of modern farm buildings requires as much expert advice as the erection of dwelling-houses or factories. The aspect most favoured is S. or S.E.; to facilitate drainage the buildings should be erected on rising ground.

The production of milk under hygienic conditions calls for special attention in the erection of modern cowsheds, which are now usually equipped on American principles. Low mangers, tubular iron stanchions, stall division, and neck yokes have done much to ensure cleanliness, particularly in preventing the udders and hind-quarters of the cows from becoming soiled with manure. Ventilation, light, and drainage were far from satisfactory in the older types of cow houses, but these defects have been largely remedied of recent years. Surface drainage, the abolition of

the old insanitary subsoil and indoor trap systems, the conservation of the liquid manure in suitable tanks apart from the buildings, and the removal of the solid excrements to some distance from the byres, all tend to more healthy, sanitary, and better economic conditions.

Although previous to the Great War something like £10 per acre was required to stock and equip a farm and leave something in hand for working expenses and current expenditure until stock and crops matured, under post-war conditions it requires at least an 80 p.c. increase on this estimate if the farm is to be reasonably well stocked and equipped. Farms are usually let on a lease for a term of years or on a yearly tenancy, but there can be no doubt that much of the land in the British Isles will be much more intensively farmed under some satisfactory system to ensure proper security of tenure. See *A Pilgrimage of British Farming*, A. D. Hall, 1913.

**Farman.** Name of aeroplanes built by the brothers Henry and Maurice Farman. The son of an English journalist, Henry (b. 1875) was born in France and began his career as a bicycle racer, then manufactured bicycles and motor-cars. He took up aeronautics in 1907, and developed and perfected an aeroplane known by his name, making his first trials at Issy-les-Moulineaux, Nov., 1907-Jan., 1908. He was the first aviator to fly from town to town (Châlons-Reims, 1908), and to fly 100 miles (Reims, 1909). He established in 1908 a school of aviation and works at Buc, near Versailles.

Maurice Farman established aviation works a little later, and in 1912 the two combined their resources, erecting a factory at Billancourt. They supplied aeroplanes to the French army and other countries, including Britain. Various types of their machines did good work in the Great War. See *Aeronautics*; *Aeroplane*.

**Farm Colony.** Name given to a settlement of persons on the land for the purpose of cultivating it. The experiment has been tried in England, America, and elsewhere with varying degrees of success. General Booth established one in Essex to solve the unemployment problem. The first farm colony for ex-soldiers was established in 1916 at Holderness, in E. Yorkshire. It was intended to provide about sixty holdings, averaging thirty-five acres each. The Small Holdings (Colonies) Act, 1916, arranged for the settlement of discharged service men at Holbeach, Patrington, and elsewhere.



An important farm colony was founded at Lasswade, near Edinburgh, by Sir Robert Philip, in 1910. Known as the Royal Victoria Farm Colony, in four years it passed out 88 fit men to employments, who had entered it in various stages of disablement and disease. In 1920 it was proposed to establish a colony for sailors and soldiers suffering from tuberculosis, and 115 acres were acquired at Frimley, Surrey. *See Land Settlement; Small Holdings.*

**Farmer.** One who farms land, an agriculturist. Originally the word had a different meaning, referring to one who collected the taxes by contract. The farmer collected as much as he could, but paid over a fixed sum, called the *firma*, to the king. There was a system of this kind in Rome; it was done by the sheriffs in medieval England. The word was used later for one who took over a piece of land, paying a fixed sum for the right to cultivate it, and this is the modern sense. *See Agriculture; Farm.*

**Farmer, JOHN** (1835-1901). British musician. Born at Nottingham, Aug. 16, 1835, he studied



John Farmer,  
British musician

*Elliott & Fry*

music at Leipzig and Coburg, and afterwards taught it at Zürich. In 1862 he settled at Harrow, and in 1864 was made music master at the school. From 1885 until his death he was organist of Balliol College, Oxford, where he arranged Sunday evening concerts and founded the Musical Society. He died July 17, 1901. In addition to his song tunes, Farmer wrote oratorios and edited a volume of songs for soldiers and sailors, and another for children.

**Farmer, JOHN BRETLAND** (b. 1865). British botanist. Born at Atherton, April 5, 1865, and educated at Magdalen College, Oxford, he was demonstrator in botany to the university, 1887-92, when he became assistant professor of biology at the royal college of science, S. Kensington. In 1895 his chair was made independent, and he became professor of botany.

**Farmer-General.** Member of a financial organization in France under the monarchy, who, in consideration of payment of an agreed sum to the government, secured the privilege of collecting taxes. The system, based upon that of the Roman *publicani* (q.v.), seems to have been in existence in

France in the 14th century and was firmly established in the 16th. In the general reform of fiscal methods which followed the Revolution the farmers-general were abolished.

**Farmer Labour Party.** American political party. Organized in Chicago in July, 1920, it ran as its candidate for president at the election of that year Parley P. Christensen, of Salt Lake City, Utah. As its name implies, it was in the main composed of radical farmers from the West, dissatisfied with "Wall Street" and the general financial system, and Labour extremists, and it aroused special interest as representing for the first time in American politics a separate party of this kind.

#### Farmers' Alliance.

Political party in the U.S.A. It began about 1873 when societies of the kind were established in Texas and other states, the movement being the successor of that known as the Grange. In 1882 some of these

associations banded themselves together in a national society, and in 1889 the name of National Farmers' Alliance and Industrial Union was taken. It consisted mainly of farmers of the South, and the adopted programme included many changes for the benefit of the farming interest. The alliance took an active part in politics, especially at the elections of 1890. In general it supported the Democrat candidates, but it secured seats for some of its own nominees, and controlling power in Kansas and Nebraska. In 1914 it represented about 3,000,000 farmers, and had a programme which included the restriction of immigration and the free distribution of seed. *See Grange Party; Populist Party.*

**Farmers' Club.** London club founded in 1842. Affording a convenient social centre for those interested in agriculture, it is housed at 2, Whitehall Court, S.W. The term is also often applied to the co-operative trading societies formed under the auspices of the Agricultural Organization Societies of England, Scotland, and Ireland. *See Agricultural Organization.*

**Farmer's Dynamite.** Explosive of the gelatine dynamite type. It was specially manufactured to provide a mild, cheap ex-

plosive which would be suitable for breaking up sub-soil, uprooting tree stumps, and similar agricultural purposes. It is a mixture of about 40 p.c. of nitroglycerine, gelatinised with nitrocellulose, 18 p.c. of dry wood meal, 40 p.c. of sodium nitrate, and a small proportion of magnesium carbonate.

**Farnborough.** Urban dist. and parish of Hampshire, England. It is 33 m. S.W. of London, on the S.E. & C. and L. & S.W. Rlys. A mausoleum attached to S. Michael's Roman Catholic church, built by the Empress Eugénie, contains the remains of Napoleon III, the Prince Imperial, and the empress herself.



Farnborough, Hampshire. The mausoleum among the trees where Napoleon III, Empress Eugénie, and the Prince Imperial are buried; it was erected in 1887

For many years the exiled lady lived at Farnborough Hill. Within the Aldershot area, Farnborough contains north camp, and early in the 20th century Farnborough Common was chosen as the site of the Royal Aircraft Factory. Here, too, is a large aerodrome. Pop. 14,200. Another Farnborough is a village in Kent, 4 m. S.E. of Bromley (pop. 3,210), and there are Farnboroughs in Berkshire and Warwickshire.

**Farnborough, THOMAS ERSKINE MAY, BARON** (1815-86). British historian. Born in London, Feb. 8,



T. Erskine May,  
Baron Farnborough

1815, he was educated at Bedford Grammar School. In 1831 he became an assistant in the library of the House of Commons, and in 1838 was called to the bar. In 1846 he was made an examiner of private bills; in 1847 a taxing master, and in 1856 a clerk assistant to the House. In 1871 he was appointed clerk of the House of Commons, and he retired in April 1886, dying in London a month later, May 17. He had been knighted in 1886, and was made a peer a few days before his death. He left no heir. Erskine

May's long association with the House of Commons, together with his aptitude for research, made him the chief authority on its procedure, on which he wrote several books notably his *Treatise on the Law, Privileges, Proceedings and Usage of Parliament*, 1844. Taking a wider range, he devoted himself to the constitutional history of England, and his work dealing with the period, 1760-1860, published 1861-63, remains the standard authority on the subject. He wrote also *Democracy in Europe*, 1877.

**Farne, FEARNE OR FERN ISLANDS, OR THE STAPLES.** Group of seventeen rocky islets and rocks off the coast of Northumberland, England, separated from the mainland by the Fairway Channel. Farne or House, the largest (16 acres), was the retreat of S. Cuthbert (*q.v.*) in the 7th century, and Longstone with its lighthouse is famous for its association with Grace Darling (*q.v.*).

**Farnese.** Name of the Italian ducal family of Parma during the 16th and 17th centuries. First appearing in history as lords of Farnete, in Tuscany, in the 12th century they became prominent by the election as pope Paul III of Alessandro Farnese, 1534, brother of Giulia, favourite of pope Alexander VI. In 1545 pope Paul gave the duchy of Parma to his natural son Pierluigi (1503-47), a notorious libertine, murdered by partisans of Charles V. at Piacenza. Of Pierluigi's sons, Alessandro (1520-89) became a cardinal in 1534, and completed the Farnese Palace (*q.v.*) in Rome, while Ottavio (1521-86), after a long struggle with his grandfather the pope, became 2nd duke of Parma in 1551, recovering Piacenza a few years later. His son Alessandro was the famous soldier

in Spanish service, better known as the 3rd duke of Parma (*q.v.*).

Elizabeth Farnese, (1692-1766) was the last notable member of the family. Daughter of



Elizabeth Farnese,  
Queen of Spain

From a print

Odoardo Farnese, she married in 1714 Philip V of Spain, whose weakness, and in later years insanity, left her the virtual ruler of Spain during his nominal reign. With cardinal Alberoni she worked for the restoration of Spanish rule in the lost Italian provinces, a scheme only broken by the demands of the Quadruple Alliance in Jan. 1720. The direct Farnese succession ended with Antonio (1679-1731).



Farne. S. Cuthbert's church, Inner Farne, on the site of the hermitage where the saint died in 687

Valentine

**Farnese Palace.** Building in Rome, one of the finest examples of later Renaissance architecture. It was designed and begun in 1530 by Antonio da Sangallo, and the work was carried on and completed by Michelangelo, Vignola, and Giacomo della Porta. The length of the front

façade is 190 ft., and the building is 260 ft. deep and 97 ft. high to the top of the cornice. The latter, the most striking feature, was added by Michelangelo, who was also responsible for the upper storey which it crowns. The courtyard on the S. side is surrounded by arcades, modelled on those of the Colosseum. The building was commissioned by Cardinal Alessandro

edifice, and the other buildings include the town hall and an old grammar school.

Above the town stands the castle, the seat of the bishop of Winchester. The first castle was built in the 12th century, but this and also its successor were de-



Farnese Palace, Rome. Arcade of the courtyard, a magnificent example of the architectural work of Michelangelo

Farnese, afterwards Pope Paul III, and it remained in the possession of the Farnese family until the latter became extinct in the 18th century. It then passed, with the Villa Farnesina, to the king of Naples.

stroyed. The present building dates mainly from the 17th century, although there are slight remains of its predecessors. Near the town are Moor Park, the residence of Sir W. Temple, where for

a time Swift lived, and the ruins of Waverley Abbey. Farnham belonged to the bishop of Winchester before 1066, and one of the bishops made it a chartered town. Having decayed, it ceased to be a borough in 1789. Here Cobbett was born, his birth-place being now an inn, The Jolly Farmer. Market day, Mon. Pop. 7,365.



Farnham. Front view of Farnham Castle, the seat of the bishop of Winchester. The magnificent cedars on the lawn were brought direct from Lebanon

**Farnol, JOHN JEFFREY** (b. 1878). British novelist. Born Feb. 10, 1878, and educated at a private school, he began writing while in his teens. In 1902 he went to America, where he painted theatrical scenery, and contributed stories to various periodicals. In America he published his first volume, *My Lady Caprice*, 1907 (later reissued as *Chronicles of the Imp*).



Jeffrey Farnol,  
British novelist

Elliot & Fry

In 1910 he returned to England, and by the publication of *The Broad Highway* achieved popularity as a writer of healthy sentimental adventurous romance. Later stories included *The Money Moon*, 1911; *The Amateur Gentleman*, 1913; *The Honourable Mr. Tawnish*, 1914; *Beltane the Smith*, 1915; *Our Admirable Betty*, 1918; and *Black Bartlemy's Treasure*, 1920. Farnol also wrote *Some War Impressions*, 1918.

**Farnworth.** Urban district and parish of Lancashire. It is 3 m. S.E. of Bolton, of which it is practically a suburb, and has a station on the L. & Y. Rly. Sharing in the industries of Bolton, it has spinning mills, engineering works, and machinery shops, while around are coal mines. Bricks and tiles are made here. S. John's is the chief church, and there are a number of Nonconformist places of worship. The council owns the electric lighting and tramway undertakings, markets, baths, cemetery, town hall, library, and refuse destructor. Water is supplied by Bolton Corporation. The gas supply is owned by a public company. Market days, Mon. and Sat. Pop. 28,131.

**Faro.** Gambling card game. It is one of the oldest of banking games, supposed to be of Italian origin, and under the name of Pharaon was very popular in the time of Louis XIV. It requires costly apparatus and a lay-out. A full pack of 52 cards is put into a dealing box with an open top, one card being released at a time. The first card in sight at the beginning of each deal is called *soda* and the last card left in the box is *in hoc*. The dealer or banker withdraws *soda* and places it some little distance away; the next card, termed the *loser*, he lays by the side of the box. The third card taken out is the *winner*, which he places on the *soda*; thus, each alternate card is a winner or loser, eventually forming two separate

piles, with *soda* and *loser* for foundation. The object of the players is to forecast correctly (indicated by the way in which they stake their money upon the lay-out) which particular card of any suit will win or lose.

**Faro.** Administrative dist. of S. Portugal, coextensive with the prov. of Algarve. The climate is genial and the soil fertile, producing olives, dates, almonds, figs, and cereals. Area, 1,937 sq. m. Pop. 274,122.

**Faro.** Seaport and city of Portugal, capital of Faro dist. It stands on the Atlantic, at the mouth of the Rio Feroso, 20 m. S.W. of Tavira, and is the terminus of the Lisbon-Faro Rly. Its har-

bour is large and sheltered, but shallow and tidal. The town possesses a cathedral, a military hospital, a museum, and a ruined Moorish castle. Its large public square is the centre of the life of the city. It exports fruit, vegetables, wine, cork, sumach, sardines, anchovies, tunny, and baskets. Burned by the English in 1596, it was almost destroyed by an earthquake in 1755. Pop. 11,789.



Faro. Klaksvig, the principal town on Bordo Island, and Klaksvig Mountain

**Faroe** (Dan. *Färøerne*, sheep island). Group of islands in the N. Atlantic, belonging to Denmark. The group lies about 195 m. N.W. of the Shetlands, and 250 m. S.E. of Iceland. There are 21 islands, 17 of them inhabited. Of volcanic and basaltic formation, they are mountainous, rising in Slataretinde in the island of Osterö to 2,890 ft., with lofty and steep cliffs and deep fiords, and separated from each other by swift and dangerous currents. The rainfall is heavy, and storms are frequent. Lying between lat. 61° 20' and 62° 20' N., not a great distance from the Arctic Circle, the climate is mild but moist, and the harbours are seldom frozen. There are no trees, and barley is the only cereal grown; turnips and potatoes thrive, and coal and peat are found.

The chief industries are sheep-raising, cattle-breeding, wild-fowling, whaling, and fishing.

**Farquhar, HORACE BRAND FARQUHAR, 1ST EARL** (b. 1844-1923). British politician. Born May 19, 1844, a younger son of Sir W. M. Townsend-Farquhar, he was educated at Eton. He became a partner in the firm of Sir Samuel Scott & Co., bankers, but, devoting much time to social life, became



Earl Farquhar,  
British politician  
Russell

one of the intimates of the prince of Wales, afterwards Edward VII. From 1901-7 he was master of the household to the king. He sat in Parliament as a Unionist for W. Marylebone, 1895-98, retiring on being made a baron. From 1889 to 1901 he was a member of the L.C.C., and he was actively connected with the central Unionist organizations. Extra lord-in-waiting both to King Edward and King George, he was lord steward, 1915-16, made an earl, 1922, and died Aug. 30, 1923.

**Farquhar, SIR ARTHUR MURRAY** (b. 1855). British sailor. Born Jan. 19, 1855, he entered the navy in 1868 and was lieutenant of the *Bacchante* 1879-82, on board which the duke of Clarence and George V (then prince George) were training. Promoted captain

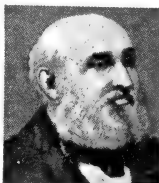
in 1896, he conveyed the duke and duchess of Connaught to the Delhi Durbar in 1902 on the Renown. Rear-admiral 1906, he commanded the fourth cruiser squadron, 1909-11, and was promoted vice-admiral. In 1913 he was appointed to command the coastguard and reserves, and in 1914 was knighted and became admiral.



Sir A. M. Farquhar,  
British sailor  
*Russell*

**Farquhar, GEORGE** (1678-1707). English dramatist. Born in Londonderry, and educated at Trinity College, Dublin, he started life as an actor in Dublin, but obtained a commission in the army, 1702. His first play was *Love and a Bottle*, 1699, which was followed by *The Constant Couple*, 1700; and *Sir Harry Wildair*, 1701. Other notable productions were *The Beaux' Stratagem*, 1707, two characters in which, *Lady Bountiful* and *Boniface*, the innkeeper, have passed into the language as types. The *Recruiting Officer*, 1706, contains the song *Over the Hills and Far Away*. Farquhar died in pecuniary difficulties. He had sold his commission to marry a professed heiress, who turned out penniless. Farquhar magnanimously forgave her. His large-heartedness is reflected in his comedies, which, though not perhaps so witty as those of Congreve, are pervaded by a human sympathy which gives reality to both plot and characters. *Dramatic Works*, ed. with *Life*, A. C. Ewald, 1892.

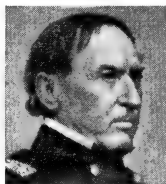
**Farr, WILLIAM** (1807-83). British statistician. Born at Kenley, Shropshire, Nov. 30, 1807, he studied medicine in Paris, and practised in London. In 1838 he was appointed compiler of abstracts to the registrar-general. For the two decennial censuses, 1851 and 1861, he was assistant commissioner, and commissioner for that of 1871. Disappointed at not obtaining the registrar-generalship in 1879, he resigned his post.



William Farr,  
British statistician

Author of many articles on statistics and actuarial matters, he wrote most of the papers on the causes of death in England in the annual reports of the registrar-general from 1839-80. He died April 14, 1883.

**Farragut, DAVID** GLASGOW (1801-70). American sailor. Born at Knoxville, Tennessee, July 5, 1801, of Spanish descent, he entered the navy, and in 1825 was promoted lieutenant. When the Civil War came in 1861, notwithstanding his southern birth, he offered his services to the Washington government, and in 1862 was given command of the Western Gulf blockading squadron. His great popularity was intensified by his brilliant forcing of the passage of the Mississippi and capture of New Orleans. After an unsuccessful operation against Vicksburg, with the aid of monitors he defeated Buchanan at



*De Tanager*

Mobile in 1864, but his health being undermined by the climate he returned to New York the same year, being made the first rear-admiral of the U.S. navy. In 1866 he was promoted admiral, and retired 1867. He died at Portsmouth, New Hampshire, Aug. 14, 1870.

**Farrant, RICHARD** (c. 1530-80). British organist and composer. A gentleman of the Chapel Royal, Farrant was for some time organist of St. George's Chapel, Windsor. Much of the music attributed to him has been proved to be by other composers, but it is probable that he composed the beautiful anthem *Call to Remembrance*. He died Nov. 30, 1580.

**Farrar, FREDERIC WILLIAM** (1831-1903). British divine and writer. Born at Bombay, Aug. 7, 1831, he was educated at London University and Trinity College.

Cambridge, and became in 1855 an assistant master at Harrow. He was headmaster of Marlborough College from 1871-76, when he became canon of Westminster and rector of St. Margaret's,



*Elliot & Fry*

being appointed archdeacon of Westminster in 1883. Farrar was made dean of Canterbury in 1895. *His Life of Christ*, 1874; *Life of S. Paul*, 1879; and *Lives of the Fathers*, 1889, enjoyed remarkable success. He died March 22, 1903.

**Farren, ELIZABETH** (c. 1759-1829). British actress. The daughter of a Cork surgeon turned actor, she made her first London appearance at The Haymarket, June 9, 1777, as *Miss Hardcastle*. She made her début at Drury Lane, Sept. 8, 1788, as *Charlotte* in *Rusport* in *The West Indian*, and acted at this theatre and The Haymarket till her retirement in 1797. At Drury Lane she succeeded Mrs. Abington as the impersonator of fine ladies and was received with favour as *Lydia Languish*, *Millamant*, *Lady Betty Modish*, *Lady Teazle*, *Berinthia* in *Sheridan's Trip to Scarborough*, and *Angelica* in *Congreve's Love for Love*. In 1797 she married the 12th earl of Derby, and died on April 23, 1829.



Elizabeth Farren,  
British actress  
*After Sir T. Lawrence*

**Farren, ELLEN OR NELLIE** (1848-1904). British actress. Granddaughter of William Farren (q.v.), and born at Liverpool, she played many parts in comedy, farce, and burlesque at Sadler's Wells, The Olympic, and The Queen's. She joined John Hollingshead's company in 1868 at the (old) Gaiety Theatre, where she remained under his management, and that of his successor George Edwardes, till her retirement in 1891, playing a principal boy in innumerable burlesques.



Nellie Farren,  
British actress  
*Downey*

**Farren, WILLIAM** (1786-1861). British actor. He made his début on the London stage, Sept. 10, 1818, as *Sir Peter Teazle* at Covent Garden, where he remained till 1828. He appeared as *Sir Peter at Drury Lane*, Oct. 16, 1828, remaining a member of the company for nine

years.

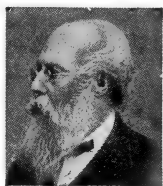
**Farren, WILLIAM** (1786-1861). British actor. He made his début on the London stage, Sept. 10, 1818, as *Sir Peter Teazle* at Covent Garden, where he remained till 1828. He appeared as *Sir Peter at Drury Lane*, Oct. 16, 1828, remaining a member of the company for nine



William Farren,  
British actor  
*From a daguerotype by Mayall*

years. In 1837 he returned to Covent Garden, which he left a few years later to join Benjamin Webster as stage-manager at The Haymarket, where he stopped 10 years. Subsequently he managed The Strand and The Olympic, taking leave of the public at The Haymarket July 10, 1855, in his favourite part of Lord Ogleby in The Clandestine Marriage. He died in London, Sept. 24, 1861. As the old man of 18th century comedy he was unrivalled.

**Farrer, Thomas Henry Farrer, 1st Baron (1819-99).** British economist. The son of a London



solicitor, he was born June 24, 1819. Educated at Eton and Balliol College, Oxford, he became a barrister, but his career was influenced by his close friendship with Sir Stafford Northcote, who secured for him in 1848 a position in the board of trade. He rose in the civil service and from 1865-88 was permanent secretary to the board. He was largely responsible for much valuable legislation, including some concerning merchant shipping and bankruptcy. In 1883 he was made a baronet, in 1893 a baron. As an economist Farrer made his reputation after his retirement. He was a strong free trader, at one time president of the Cobden Club, and was a critic of high national expenditure and bimetallism. From 1889-98 he was a member of the London County Council, and he died Oct. 12, 1899. Of his writings the best known is *Studies in Currency*, 1898.

**Farrier.** Name given originally to a man who shod horses, the word being derived from the Latin *ferrum*, iron. After a time the farrier began to attend to the diseases of the horses, and farriery

was the name for what is now more generally known as veterinary surgery (*q.v.*).

**Farriers' Company, THE.** London city livery company. Dating from 1356 as a fraternity, its first charter was granted in 1685. Farriers, who were also called ferrers, ferriers, and ferrones, are mentioned in the 13th century. They owe their ordinance to a complaint that certain unskilled ferrones, having set up forges in the city, had caused the loss of many horses. In 1758 an act of common council imposed on all operative farriers the obligation of taking up the freedom of the company. While this rule has been abandoned the company has taken in later years an active interest in the welfare of the craft by the offer of prizes for good workmanship, etc., and in 1890, in cooperation with the Royal Agricultural Society and the Royal College of Veterinary Surgeons, promoted a scheme for the national registration of farriers or shoeing-smiths. The archives of the company were almost entirely destroyed by fire in 1666. Its offices are at 140, Leadenhall St., E.C.

**Farringdon Street.** London thoroughfare running S. from Charterhouse Street to Ludgate Circus, E.C. Named after the city ward in which it is situated, it was built over the Fleet Ditch, now a sewer, in 1826-30. Fleet Market, which once occupied the site, was opened Sept. 30, 1737, and for 92 years remained a centre for the sale of meat, fish, and vegetables. It was removed in 1829-30. The market for fruit and vegetables built between Farringdon Street and Shoe Lane, N. of Stonecutter Street, and known as Farringdon Market, was opened Nov. 20, 1829, but the site, which covered  $1\frac{1}{2}$  acres,



Farriers' Company arms

(*q.v.*), built in 1874 to commemorate the fidelity to conscience of 2,000 ministers ejected from the church in 1662 by the Act of Conformity; Fleetway House, headquarters of the Amalgamated Press; and is fronted on the E. side by part of the London Central (Smithfield) Markets. Fleet Prison stood on ground partly occupied by the Memorial Hall. N. of Charterhouse Street is Farringdon Road, notable for its open market and old bookstalls, with a Metropolitan Rly. station and a goods station of the G.N.R. Farringdon Road was first called Victoria Road. It extends to King's Cross Road, and was made in 1856. See Fleet Prison.

**Farrow's Bank.** Former British bank. Founded in 1904 by Thomas Farrow, it was registered as a credit bank under the Industrial and Provident Societies Act. In 1907 it was registered as a joint stock company. With a capital of £1,000,000, the bank had 75 branches, mainly in England. In 1921 Farrow and another official were sentenced to imprisonment for fraud in connection with it.

**Farrukhabad.** District and town of India. In the E. of the Agra division of the United Provinces, the area of the district is 1,744 sq. m. The town was founded early in the 18th century. Farrukhabad city lies near the Ganges, on the rly. line from Cawnpore to Muttra, and at the end of a branch of the E. Indian Rly. from Shikohabad. It forms with Fatehgarh, lying 3 m. to the E., the headquarters of the district and the cantonment, a single municipality. Cloth printing is the chief industry. The principal crops are wheat, barley, millet, and gram; the poppy, cotton, and sugar-cane are also grown; tobacco is exported. Pop. of dist., 900,022, five-sixths Hindus; of town, 56,573, two-thirds Hindus, one-third Mahomedans.

**Fars or FARSISTAN.** Province of Persia. It lies on the E. side of the Persian Gulf, and is bounded on the N.W. by Khuzistan and Ispahan, E. by Yazd and Kerman. From the warm coastal plain the country rises into the mts., where the climate is cold. The highest mt. is the Kuh-i-Bul, 14,000 ft. The rivers are small and not numerous. There are several lakes, the principal being Niris. The capital is Shiraz, and the ports are Bushire, Lijjah, and Bander Abbas. The province contains the ruins of Persepolis. Many parts of the province are fertile, and produce wheat, barley, rice, cotton, and an excellent tobacco. Area, 60,000 sq. m. Pop. 750,000.



Farringdon Street, looking south towards Holborn Viaduct



**Farsetia.** Genus of annual and perennial herbs, and sub-shrubs of the natural order Cruciferae. Natives of S. Europe, Asia, and Africa, they have opposite, undivided leaves, and white or yellow flowers.

**Farther India** OR **INDO-CHINA.** Term used to designate the S.E. peninsula of Asia, lying E. of India and S. of China. It includes Assam, Burma, the Malay and Federated States, the Straits Settlements, Annam, Laos, Cambodia, Tongking, and Cochin China. See Indo-China.

**Farthing** (A.S. *feorþa*, fourth). Name of the smallest British bronze coin, value one quarter of a penny.



Farthing. Obverse and reverse of George V farthing, 1914

From its first appearance under Edward I, until about 1555, it was a silver coin. A copper farthing was coined in 1613, but did not form part of the true coinage till a reissue in 1672, under Charles II, who also struck a tin farthing, with a circle of copper inset, in 1684. Copper half-farthings circulated between 1842-69. The farthing became a bronze coin in 1860, and has a standard weight of 43.750 grains. The coin is legal tender up to the number of four at one time. See Coinage; Numismatics.

**Farthingale** (Span. *verdugado*, hooped). Hooped framework supporting and extending a wide skirt. The fashion was introduced from Spain into England in the time of Elizabeth, and continued until about the middle of the 17th century. It grew to a prodigious size, the big hoop at the level of the hips giving a flat, circular surface, and keeping the skirt well away from the figure. The fardingale, as it was then called, was revived in rather a different form in the time of Queen Anne, when the skirt became more bell-shaped. It was abolished by royal command in George IV's reign, but it later reappeared as the crinoline.

**Fasa.** Town of Persia. It is an important centre in the prov. of Fars, about 80 m. S.E. of Shiraz. Pop. 15,000.

**Fasano.** Town of Italy, in the prov. of Bari. It is 35 m. by rly. N.W. of Brindisi. The old palace of the Knights of S. John is now the town hall. In the vicinity are the ruins of Egnatia, an ancient port on the Applan Way. Situated in an olive-growing district, Fasano has many oil mills. Pop. 20,077.



Fasces. Roman symbol of magisterial authority

**Fasces** (Lat., bundles). Bundles of rods with an axe bound up in the middle. They were the symbols of the authority of certain of the higher magistrates in ancient Rome and were borne over the shoulders of attendants (*victores*) who preceded them. See Imperium.

**Fascia.** In anatomy, layer of connective tissue interposed between the skin and the muscles, and prolonged inwards between the muscles so as to form sheaths around them. The strength and thickness of fascia vary in different parts of the body. On the outer side of the thigh, for instance, it forms a dense, strong structure, the *ilio-tibial band*, which helps to steady the body in the erect position.

**Fascia** OR **FACIA** (Lat., bandage, fillet). Architectural term applied originally to the bands or divisions of an Ionic entablature (*q.v.*), now extended to include any flat band or facing in an entablature.

**Fasciation.** Abnormal growth of stems when they become flattened, and the branches, instead of being separate, coalesce with the stem. This is the constant condition of the flowering parts of cock's comb (*Celosia cristata*) (*q.v.*); but is often found in other herbs and trees. The willow family and the

ash often exhibit the abnormality in their upper branches.

**Fascine** (Lat. *fascina*, fagot). Name for a long fagot of thin boughs or brushwood, tightly packed and securely bound, used in military



Fascine. A fagot of brushwood on the trestles upon which it is made

engineering. For making fascines a cradle of trestles is arranged at a uniform height, the lengths of brushwood are placed thereon, and tightly packed by means of a choker, which consists of a length of chain, the two ends of which are secured to stakes, enabling considerable leverage to be brought to bear on the bundle of wood. After being compressed, the fascine is secured by withes of flexible wood bound round it.

**Fascisti**, THE (Lat. *fascia*, bundle). Society recruited from Italian Nationalists to oppose extreme socialism. Started in 1919, at first it met opposition with force, but gradually under its leader, B. Mussolini, the movement became passive, and a fascist government, with Mussolini as premier, came into being in 1922. Under him Italy recovered from the dislocation following the Great War, abuses were put down, and trade was stimulated. See Italy; Mussolini, B.

## FASHION: IN ANCIENT & MODERN TIMES

M. E. Brooke, Member of the editorial staff of Eve

The article *Costume* supplements the information given below. See also *Dressmaking* and articles on the various items of dress: *Boot*; *Cap*; *Glove*; *Hat*; *Skirt*, etc.

Derived from Latin *factio*, making, old Fr. *fachon*, this word has come to mean the prevailing mode or custom, primarily in dress but also in social intercourse, sports, and the like.

So far as Europe is concerned, many authentic records of raiment are found on tombs and cathedral doors, and stained-glass windows. In 1321 a direct attempt was made to disseminate fashion, a fashion doll being sent to the queen of England. Later these dolls were sent out at regular intervals at the beginning of the spring, summer, autumn, and winter seasons. They were dispatched from Paris to London, St. Petersburg, Rome, Lisbon, and Berlin. In the days of Catherine de' Medici, when Colbert declared that France should supply the wardrobes of the world, two

dolls were dressed in accordance with the last word in the story of fashion, one *en grande tenue* and the other *en déshabille*. They were half life-size, and, having been exhibited at the Hotel Rambouillet, duplicates were sent to the leading cities. These dolls were the forerunners of the modern fashion papers.

Curiously enough, the first paper devoted to fashion was neither published in Paris nor written in French. It was brought out by Josse Amman, a painter who was born at Zürich, and died at Nuremberg in 1586. It was published in Frankfort, was written in Latin, and was followed by *Les Modes de la Cour de France*, which treated of the costumes of the court of Louis XIV from 1675-89.

June, 1798, saw the production of *Le Journal des Dames* et des Modes by Sellèque and Madame Clément. They were joined by Pierre Lamésangère, a professor of literature and philosophy who had fallen on evil times. Two years later, on the death of Sellèque, Lamésangère took entire control, frequenting the theatres and all fashionable *rendezvous* in order to study the dresses. The journal was published at intervals of five days, with one coloured plate of a woman in an attractive gown, and on the 15th of the month there were two plates. It lasted until the death of Lamésangère in 1829.

#### History Reflected in Fashions

The vast fortune he amassed caused others to follow in his footsteps, and in a short time appeared *Le Petit Courrier des Dames*, *Le Follet* and *La Psyche*; also *La Mode*, which was under the patronage of the duchess of Berri.

Conquests have always influenced the modes. The Roman dominion of England was responsible for the abandonment of the *braccae* (breeches) and the adoption of the Roman tunic. To the Crusader is due the introduction of the taste for things Oriental. The conquests of Edward III were responsible for the French fashions in England. The "blistered" modes followed the defeat of the duke of Burgundy in 1497, for it was a compliment to the vanquished. The Wars of the Roses robbed fashion of all gaiety. The prosperity of the reign of Henry VIII was reflected in the richness of attire; the persecutions of Mary's reign had the opposite effect, and the anti-Catholics showed their disapproval in their clothes. In Queen Elizabeth's reign the magnificence of raiment, for men as well as women, was unprecedented.

This was followed by the Puritan influence. The French Revolution sounded the knell of gaiety in masculine dress. Women adopted the Athenian costume, as best expressing the feelings of the day, and the harvest of this diaphanous attire in mid-winter was consumption. Shortly afterwards public feeling became favourable to common sense in clothes whereby health received due consideration. This resulted in the disappearance of the waspish waist and tight shoes, and the adoption of wool or wool mixture underwear. In 1887 began a new era of life in London. Before that date all entertaining had been done at home. Dining in public resulted in women giving more consideration to their toilettes.

Cycling was introduced in Paris and became the rage in England

about 1896. Golf followed and caused an improvement in tailor-made costumes. In 1896 the Locomotives on Highways Act became law and the motor arrived. The South African War in 1899 put a check on fashion, but it revived after the coronation of Edward VII in 1902, when daylight drawing-rooms were abolished. In 1906 came the revival of roller-skating. In 1919 the aeroplane began to be used as a general means of locomotion, and for this last-mentioned event the notable dressmakers on both sides of the Channel were already designing costumes in 1918.

A good income may be made by fashion writers as well as artists. The former should have a thorough knowledge of the history of costume. There is no better training for this work than a subordinate position in the office of a paper, where a knowledge of what is needed, as well as of the pitfalls to be avoided, is acquired.

The fashion artist must be a clever draughtswoman, and must possess a peculiar qualification that may be called the "dress sense." There are many schools that teach fashion drawing. This they are able to do in a highly satisfactory manner provided that the student has talent and is able to draw. They are *au fait* regarding the work of reproduction for various kinds of papers, and the best methods of accentuating the essential points of the article to be sketched. See *Costume*; also *illus.* P. 1702.

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**Fashoda**, now KODOK. Town of the Anglo-Egyptian Sudan. It is situated on the W. bank of the Bahr-el-Abiad or White Nile, 470 m. S. of Khartum. The climate is extremely hot and the place is infested with mosquitoes. On the caravan route from Kordofan, it has several government buildings.

**Fashoda Affair.** Name given to an episode which occurred just after the British reconquest of the Sudan in 1898. A small French expedition under Major (afterwards General) Marchand made its way up the Niger to Fashoda, which was occupied on Sept. 7, in spite of the fact

that in 1895 the British Government had given formal notice that the Nile valley was within its sphere of influence. Sir Herbert Kitchener, who was then sirdar, went at once to Fashoda and asked Marchand to withdraw. The French officer refused, but on Nov. 5, after further negotiations, his government ordered him to give up the post. By an agreement signed March 21, 1899, France undertook to withdraw from the Nile valley, and a new boundary between the areas protected by the two countries was outlined. The affair caused a good deal of excitement in both countries.

**Fassaita.** Greenish variety of mineral augite. It is named after the Fassathal Tirol, where it was first found. See *Augite*.

**Fast and Loose.** Dishonest game formerly much played by gypsies and tricksters, known also as prick the garter. The victim was invited to push a pin or bodkin through a folded belt so as to fix it to the table, but the folds were so disposed by the owner that on the ends being pulled it came free, and the stake was forfeit. From this came the expression "to play fast and loose," i.e. to repudiate expressed obligations when these seem no longer convenient to acknowledge.

**Fast Castle.** Ruined fortress of Berwickshire, Scotland. It stands on a steep cliff about 3½ m. N.W. of St. Abb's Head, and was formerly a stronghold of some importance, though little now remains of the buildings. It was to Fast Castle that James VI of Scotland was to have been brought by the Gowrie conspirators, and it is described as Wolf's Crag by Scott in *The Bride of Lammermoor*.

**Fast Colours.** Broadly speaking, colours which behave satisfactorily in wear for a reasonable time—say, six months. Colours should be fast against sunlight and water, rubbing, the action of street mud, and of perspiration. Colours are frequently required to be fast against specific finishing or manufacturing processes, e.g. against milling and potting. See *Dyes*.

**Fasti** (Lat. *fas*, divine law). Latin word meaning lawful, applied to those days (*dies fasti*) in the year on which legal business could be done, as opposed to days on which it could not (*dies nefasti*). The word then came to mean a calendar. Such calendars were of two kinds: *Fasti diurni*, a calendar indicating religious festivals, market days, etc.; *Fasti annales*, a calendar giving the names of the magistrates for the year and the chief events.

**Fasting** (A.S. *faestan*, to hold fast, observe). Total or partial abstinence from all or special kinds of food and drink. Such abstinence has been practised for religious or other reasons by people of all nations from early times. It has formed part of both pagan and Christian asceticism (*q.v.*), in a religious sense being enjoined or commended together with prayer and almsgiving, and regarded as a method of self-discipline which, controlling the animal appetites, enables the mind more clearly to apprehend and appreciate spiritual truths.

The Mosaic law prescribed one great fast day in the year, the Day of Atonement or 10th day of the 7th month (Lev. 16); others were added in commemoration of events connected with the captivity (Zech. 8); and in the O.T. many instances are recorded of individual and communal fasting. The king of Nineveh, when Jonah prophesied its fall, proclaimed a general fast, and the city was spared (Jonah 3). In the N.T. Jesus Christ is represented not as enjoining His disciples to fast, but as teaching that, whenever fasting was undertaken, it was to be without ostentation and with purity of intention (Matt. 6). At the same time He indicated that it would be a duty after His departure (Matt. 9; homily On Fasting ii); and said of certain demons (Mark 9, A.V.) "This kind can come forth by nothing but by prayer and fasting (R.V. omits "and fasting"). Fasting was recommended and practised by the apostles (Acts 13, 14; 2 Cor. 6, 11). In the early Church fasts were kept on Wednesdays and Fridays, and during Lent.

Unlike the Roman Catholic Church, the Church of England makes no distinction between fasting and abstinence (*q.v.*). In the homily On Fasting, the custom is said to be of itself a thing merely indifferent. It is regarded not as a means of grace but as a preparation for the means of grace, and is voluntary, and the rule, obligatory among Roman Catholics, as to partaking of the Holy Communion fasting, is observed only among High Church Anglicans. The proclamation of 1548 for the abstaining from flesh in Lent time (2 and 3 Edward VI, c. 19) was issued for political and economic reasons. At the same time, the Book of Common Prayer enumerates as days of fasting or abstinence the 40 days of Lent, Ember days, Rogation days, all Fridays except Christmas Day, and the evens or vigils of certain festivals where these festivals do not fall on a Monday, Sunday never being a fast day.

The manner of fasting or abstinence is left to the individual.

In the Roman Catholic Church all baptized persons who have completed their 21st year are bound to observe the days of fasting, on which they may not eat more than one full meal, this meal to be without flesh meat, and to be eaten after mid-day. The days of fasting are all Lent, except Sundays, the Ember days, vigils of the more solemn feasts, all Fridays except those falling within 12 days of Christmas, and between Easter and the Ascension. Fasting is exceptionally strict in the Eastern Church, in which 226 days are set apart for it in the year; it is an important religious duty among the Hindus; and among Mahomedans, who regard the practice as mitigating the penalties of sin, the month of Ramadan (*q.v.*) is a period in which fasting is obligatory. In ancient Greece rigid fasts preceded the solemnities of the Eleusinian mysteries; and in Rome every fifth year a general fast was held in honour of Ceres.

From a physiological or medical point of view, abstention from food leads to the tissues of the body being consumed in order to maintain the output of heat and energy. Hence, progressive emaciation occurs, absorption of the fat in the tissues being well marked. The face becomes pale, the cheeks sunken, and the eyes hollow. The abdomen sinks in and the bones become prominent. The temperature is often subnormal.

Towards the end, mental symptoms may appear and hallucinations may be followed by coma and death, the immediate cause of which appears to be reduction of the bodily temperature. The duration of life under such conditions varies within wide limits. Instances apparently well authenticated are recorded of survival for upwards of forty days. A notable case of fasting was that of the lord mayor of Cork, Terence MacSwiney, who in 1920 fasted in Brixton prison, dying, after abstaining from food for 73 days, on Oct. 25, 1920. After a fast the stomach is not in a condition to exercise its functions normally, and at first only very

small quantities of liquid and easily digested food should be given. See Hunger Strike; Starvation.

**Fastnet.** Rock off the S.W. coast of co. Cork, Ireland. It has a lighthouse showing a flashing light visible for 18 m.

**Fat.** Chief constituent of fatty or adipose tissue, which is present to a varying extent in nearly all



Fastnet. The lighthouse as it was completed in 1907. The old building on the rock has since been demolished

parts of the body. Adipose tissue consists of a foundation of connective tissue in the meshes of which are the fat-cells containing an oily material which is a mixture of palmitin, stearin, and olein formed by combination of fatty acids with glycerol. Chemically, fat consists of carbon, oxygen, and hydrogen, and its function in the animal economy is to provide a reserve of combustible material which is drawn upon to maintain the heat of the body. See Obesity.

**Fatalism** (Lat. *fatum*, fate). View that all the events of human life are ordained beforehand by an absolute necessity. Such was the view of Epicurus and the Stoics, and it is held by Mahomedans at the present day. Fatalism differs from determinism, according to which events stand in a relation of cause and effect to other events immediately preceding, in that it asserts that, no matter how much the antecedent causes may be varied, it will not affect the pre-ordained result. See Free Will.

**Fata Morgana.** Form of mirage seen in the straits of Messina between Sicily and Calabria. The name is due to the fact that it was supposed to be the work of a fata or fairy named Morgana. In this type of mirage, which is seen across calm water, inverted images of ships, etc., are seen in the air above the real objects. The term is in general use to describe a mirage (*q.v.*).

**Fat Boy, THE.** Character in Dickens's *Pickwick Papers*. Page-boy to Mr. Wardle, Joe is enormously fat and given to somnolence in the intervals between meals. On his own confession he delights in making people's flesh creep by making himself the vehicle for unpleasant news.

**Fatehganj.** A village of the United Provinces, India. In the district of Bareilly, it is 23 m. S.E. of Bareilly, and was founded to commemorate the British victory over the Rohillas in 1774. A few miles N.W. in the same district there is another village of this name, where the Rohillas were defeated by the British in 1796. Pop. 2,569, two-thirds Hindus.

**Fatehgarh.** Town of the United Provinces, India. The headquarters of Farrukhabad district, it forms with Farrukhabad city, 3 m. to the W., a single municipality. The fort near the Ganges was built in 1714 by Nawab Mahomed Khan. A monument commemorates the European residents who lost their lives in the Mutiny. *See* Farrukhabad.

**Fatehpur.** Dist. and town of the United Provinces, India, in the Allahabad division. The area of the district, which lies between the Ganges and the Jumna, is 1,642 sq. m. Slightly more than half the district is under cultivation, the chief crops being gram, barley, wheat, rice, and cotton. Fatehpur town is on the E. Indian Railway. Pop. dist., 676,939, 90 p.c. Hindus; town, 16,939, almost equally Hindus and Mahomedans.

A second town of the same name, which is situated in the Bara Banki district of the United Provinces, is noted for its old buildings, some of which tradition assigns to the 14th or 15th century. Pop. 6,801, three-fifths Mahomedans, two-fifths Hindus. A third town belongs to the Sikar chieftainship in Jaipur state, Rajputana. It is 146 m. N.W. of Jaipur. Pop. 17,294, two-thirds Hindus, 30 p.c. Mahomedans.

**Fatehpur Sikri.** Town of the United Provinces, India. It is 23 m. W. of Agra city, and was founded in 1569 by the Mogul emperor, Akbar, to whom the saint Salim Chishti foretold the birth of a son. A wall nearly 5 m. long runs along three sides of Akbar's town. The modern town lies near the western end. Prominent among the buildings are the mosque with Salim Chishti's mausoleum in the quadrangle, the palace named after Akbar's Rajput wife, and his own palace and audience halls. Pop. 6,132, three-fifths Hindus, the rest Mahomedans.

**Fates.** In classical mythology, goddesses who presided over the destinies of men. By the Greeks they were called Moirai, by the Romans Parcae. They were three in number, and were daughters of Zeus and Themis, or daughters of Night and Erebus. Clotho, the youngest of the three sisters, held the distaff which spun the thread of life; Lachesis mixed good and evil fortune with it; Atropos cut the thread at the allotted moment. They were very powerful goddesses, with whose decrees even Zeus himself was unwilling to interfere. In art the Fates are generally represented as aged women, but sometimes as maidens of grave mien: Clotho with a distaff or book of fate; Lachesis pointing with a staff to a globe; Atropos with a pair of scissors or a pair of scales.

**Father.** Word common to most Indo-European languages, the forms of which differ slightly in accordance with phonetic laws. Originally denoting a male parent, then by extension a remoter relationship such as ancestor or forefather, it came to be applied to the inventor or first person prominent in any art or pursuit. Thus, the Greek historian Herodotus is popularly called the father of history. Father is also a term of respect, as conscript fathers for the senators of ancient Rome; father of his country for Cicero, Augustus, and other emperors; father Thames and father Tiber. Special applications are the Pilgrim fathers, the first settlers in North America; father of the House, the member of the House of Commons who has sat in it longest without a break. In theology, Father is used for the Supreme Being, the First Person of the Trinity; for a priest of the Roman Catholic Church; and for the earliest Christian writers. In Rome the father of the family had very wide powers over his children and household. *See* Family; Patria Potestas.

**Fatherhood.** Theological term for one aspect of the relationship of God to the universe generally, and to man particularly. In most ancient religious systems the idea of paternity, usually associated with that of maternity, is connected with the Deity or the chief of the deities worshipped. The deity is married, and is a father, but the goddess never ranks on an equality with him. In monotheistic systems the two ideas of paternity and maternity are combined in one God who is the cause and progenitor of all existence.

In Christian theology the term father is applied to the First Person of the Trinity, both as expressing

a special relationship to the Son and an attitude as Creator, sustainer and chief benefactor of the human race. This aspect of God as the Father of His people was only gradually unfolded in the Hebrew Scriptures, and it was not until post-exilic days that the idea of a warrior king appears to have been superseded by that of a loving and merciful Father. The teaching of Christ developed the doctrine to a degree unknown before. He claimed to be in a special sense the Son of God, and in Him all Christians are the children of God by adoption and regeneration. This feature of Christ's teaching was unique, and is the key to the whole Christian system. It is because God is our Father that His love prevails over His wrath at man's disobedience, and He sends forth His only begotten Son to be an atonement and to make possible the repentance of the sinner and the pardon of his sin. *See* Trinity.

**Father Lasher.** Marine species of bullhead. Common around the British coasts, it has a large flattened head, and the spines can inflict an unpleasant wound if the fish is carelessly handled. The male acts as guardian of the spawn. *See* Bullhead.

**Father of the Chapel.** Name given to one who presides over the meetings of employees in a printing or newspaper office. *See* Chapel.

**Fathers of the Church.** Term specially applied to early Christian writers pre-eminent for learning and sanctity, whose works are regarded as having authority next after that of the Bible. The name seems to have been generally accepted by the 4th century. It has, however, always been used rather loosely. Even writers like Origen, whose orthodoxy was open to dispute, have been included among those who are known as fathers of the church.

The prominent writers of the 1st century were known as the apostolic fathers from their personal association with the apostles, whose teachings they are held to reflect. The list of the church fathers has been held to include writers down to the 12th century; but in common practice it is restricted to those antecedent to S. Gregory the Great (A.D. 604) in the Western Church and to John of Damascus (A.D. 756) in the Eastern. Some authorities, however, regard S. Bernard of Clairvaux (d. 1153) as the last of the fathers.

The chief church fathers are usually divided as follows: *Doctors of the church*—Athanazius, Basil the Great, Gregory Nazianzus, Chrysostom, Ambrose, Augustine, Jerome,

and Gregory the Great. *Ante-Nicene Fathers*—Justin Martyr, Clement of Alexandria, Origen, Tertullian, Irenaeus, Cyprian, Gregory Thaumaturgus; *Post-Nicene Fathers*—Eusebius, Cyril of Jerusalem, Gregory of Nyssa, Theodoret, Hilary of Poitiers, Hilary of Arles, Leo the Great, John of Damascus, and others. The Venerable Bede is sometimes included in the last category.

In the Roman Church, the fathers, in their testimony to the fundamental doctrines of the faith, are held to be without fault, and their teaching is to be accepted without question; but in details and method of teaching they are of varying authority and value. Among Protestants no such authority is assigned to them; but the general consensus of the fathers is regarded as of the highest importance as showing how the early Church understood the teaching of Christ and His Apostles. The writings of all the chief fathers of the Church are included in Migne's edition, in 387 large volumes, 1844-66; and most of them have been translated into English.

**Fathom.** Nautical measure 6 ft. in length. Cables, etc., are measured by the fathom, and lead lines are marked off in fathom spaces.

**Fatigue.** Condition produced by prolonged or excessive muscular activity, due partly to consumption of the available energy-producing materials, and partly to the accumulation in the tissues of the waste products formed during these efforts. The physiology of fatigue in a single muscle can be studied graphically with the aid of the muscle-nerve preparation, obtained by dissecting out the gastrocnemius muscle from the leg of a frog with the nerve attached. In the living being, besides the changes in the muscles, the development of fatigue is increased by the exhaustion of the central nervous system which follows the accumulation of waste products in the blood.

The scientific study of fatigue in workers received a great impetus during the Great War owing to the importance of securing the maximum output from munition factories. Researches show that both the hourly and the absolute output may be materially influenced by fatigue, and that to secure the best results for each form of work there appears to be a definite period of labour. If this period is exceeded the worker never recovers fully from his fatigue, and the total decline in the average hourly output may be greater than the increase made by working overtime. Among

women engaged in moderately heavy work, it was found that a diminution of the hours by 8.5 p.c. actually increased the weekly output by 8 p.c. Among men engaged in heavy labour a decrease of hours from 61.5 to 56.2 per week eventually increased the hourly output by 24 p.c. Similar observations have shown that in the great majority of cases Sunday labour is a mistake, the worker requiring at least one full day's rest a week.

Other investigations showed that fatigue is less severely felt by workers who are well and properly fed. A group of women, whose early morning period of work was suspended so that they had time to obtain a properly cooked meal, increased their average output in the remaining hours by 12.4 p.c., although the length of the working day was reduced by 20 p.c. The general application of these principles to industry should be of great benefit, for at present most managers of factories have a tendency towards establishing uniformity of hours for all types of labour and for workers of both sexes, and in consequence do not always get the best results. See *Factory*.

**Fatigue.** Term used in metallurgy. It was at one time generally assumed that so long as a metal was not stressed beyond its limits of elasticity, it could never give way; thus one might go on bending a bar of steel or iron backwards and forwards for ever, and so long as the bar was not bent so far that it did not recover itself, it would never break. It has been shown, however, that a continued vibratory stress, even well within the limits of elasticity of a metal, will in time "fatigue" it and cause a rearrangement of the molecules, a crystallisation in fact, or a change in the original crystalline structure, which will result in fracture; or a microscopic flaw may by such stressing be developed into a plane of rupture. Formerly, before the manufacture of steel was so well understood as it is to-day, when the axles of railway carriages were made of malleable iron, breakages occurred and serious accidents resulted owing to the original fibrous structure of the axle having been changed into a crystallisation by repeated vibratory stresses. See *Steel*.

**Fatigue.** Duty performed by soldiers in connexion with the administration of the troops. It includes coal carrying, loading baggage, cleansing surface drains and flushing latrines, sweeping yards and removing snow, but not personal service for officers. When employed on whitewashing buildings or other technical work, which

properly should be performed by a departmental corps, the troops are called "working parties," and receive "working pay."

**Fatima** (c. 606-632). Daughter of Mahomet by his first wife Kadijah. Born at Mecca, she was the prophet's favourite daughter, and was called by him one of the four perfect women in the world. She bore her husband Ali three sons, Al-Hassan, Al-Hussein, and Al-Muhsin. From the first two were descended the Fatimate caliphs of N. Africa and Syria.

Another Fatima was the heroine of Perrault's story of Bluebeard, where, as his seventh and last wife, she discovered the bodies of her predecessors. (See *Bluebeard*.) The name also occurs as that of an enchantress in the Arabian Nights story of Sindbad the sailor.

**Fatshan.** City of China, in the prov. of Kwang-tung. It lies in the Si-Kiang and Pe-Kiang delta, 7 m. S.W. of Canton. It has iron and steel industries, and a trade in cereals, oil, timber, and cassia. At Fatshan Creek, a number of Chinese junks were destroyed by British naval forces during the war of 1857. Pop. est. 400,000.

**Fatty Acids.** Series of acids with the general formula  $C_n H_{2n} O_2$ , so-called because most of them occur in natural fats. The formula given above requires the number of hydrogen atoms to be double the carbon atoms in each acid. The following is a list of those at present known, arranged in order of their carbon atoms:

$C_2 H_4 O_2$  Formic.  
 $C_2 H_4 O_2$  Acetic.  
 $C_3 H_6 O_2$  Propionic.  
 $C_4 H_8 O_2$  Butyric.  
 $C_5 H_{10} O_2$  Valeric or pentole.  
 $C_6 H_{12} O_2$  Capric or hexoic.  
 $C_7 H_{14} O_2$  Oenanthylic or heptole.  
 $C_8 H_{16} O_2$  Caprylic or octole.  
 $C_9 H_{18} O_2$  Pelargonic or nonole.  
 $C_{10} H_{20} O_2$  Capric or decatoic.  
 $C_{11} H_{22} O_2$  Undecylic or hendecatoic.  
 $C_{12} H_{24} O_2$  Lauric or dodecatoic.  
 $C_{13} H_{26} O_2$  Tridecyllic or tridecatoic.  
 $C_{14} H_{28} O_2$  Myristic or tetradecatoic.  
 $C_{15} H_{30} O_2$  Pentadecatoic.  
 $C_{16} H_{32} O_2$  Palmitic or hexadecatoic.  
 $C_{17} H_{34} O_2$  Margaric or heptadecatoic.  
 $C_{18} H_{36} O_2$  Stearic or octadecatoic.  
 $C_{19} H_{38} O_2$  Nonadecatoic.  
 $C_{20} H_{40} O_2$  Arachidic or enendecatoic.  
 $C_{21} H_{42} O_2$  Mellic.  
 $C_{22} H_{44} O_2$  Behenic or isoicolic.  
 $C_{24} H_{48} O_2$  Lignoceric.  
 $C_{25} H_{50} O_2$  Hyaeasnic.  
 $C_{27} H_{54} O_2$  Cerotic.  
 $C_{30} H_{60} O_2$  Melissic.  
 $C_{34} H_{68} O_2$  Dictylic.  
 $C_{63} H_{126} O_2$  Theobromic.

The fatty acids may be roughly divided into two classes, liquid and solid. Those containing ten or more atoms of carbon are solids. All dissolve readily in alcohol and ether. The lower members of the series are soluble in water, but the solubility decreases as the number of carbon



atoms increases. The acidity diminishes with the increase in the carbon atoms, this property being utilised in a process for separating the various acids. Another process of separation depends upon the progressive decrease in the solubility of the barium, magnesium, and lead salts. All the fatty acids, except formic and acetic, are oily or greasy. The boiling-point rises about  $19^{\circ}$  for each addition of  $\text{CH}_2$  in the formula, in the case of the acids from formic to capric. The melting-points of the solids show a similar rise. The volatility of the acids decreases as the carbon atoms increase, so that lauric acid and those higher in the series can only be distilled without decomposition under diminished pressure. The acids with an odd number of carbon atoms are comparatively rare.

**Fatty Compounds.** In organic chemistry, those in which the carbon atoms are connected together by a single linking. They are also known as saturated compounds because chemical changes are brought about by substituting one atom or group by other groups. Another series of organic compounds containing less hydrogen than the fatty compounds are known as unsaturated compounds, as they can combine directly with hydrogen or chlorine. The fatty acids belong to the group of fatty compounds.

**Fatty Degeneration.** Change in the cells of animal tissues in which the constituents of the cell become partly broken down into fat. It may be the result of various diseases, e.g. pernicious anaemia, or poisoning by certain substances, such as phosphorus or arsenic, or, more frequently, may follow lessening of the blood supply to an organ owing to narrowing of the arteries. The last is the usual cause of fatty degeneration of the heart.

**Fatwa.** Town of Bihar and Orissa, India, in the Barh subdivision of the Patna district. It is situated on the E. Indian Rly., 7 m. S.E. of Patna, at the junction of the Punpun with the Ganges. It is a resort of pilgrims. Pop. 74,757, 90 p.c. Hindus.

**Faubourg.** French word for a suburb, e.g. the Faubourg St. Honoré in Paris. It comes from Latin words meaning outside the borough or burg, and in the days when cities had walls was given to suburbs outside them.

**Faucher, LÉON JOSEPH** (1803-54). French economist and politician. Born at Limoges, Sept. 8, 1803, he became prominent as a journalist, chiefly on *Le Temps* and *Le Courrier Français*, between 1830-42, making a close study of economic problems and exerting a

moderating influence on the liberal factions. Elected a deputy in 1847, he was also returned to the constituent assembly of 1848 for the Marne dept. He was a strong advocate of free trade principles, influenced by a visit to England in 1843. Although minister of the interior in 1848-49, and again in 1851, his active political career was not successful, and he retired from public life in protest against the adoption of universal suffrage in 1851. He was largely responsible for the foundation of the *Crédit Foncier (q.v.)* in 1852. He died Dec. 14, 1854.

**Fauchet, CLAUDE** (1744-93). French Revolutionist. Born Sept. 22, 1744, he became a priest in Paris and tutor in a noble family. His preaching won fame for him, and after being dismissed from his position as court preacher he joined the Revolutionary party. He helped in the attack on the Bastille, and was afterwards a member of the legislative assembly and the national convention. He was made bishop of Calvados, but ceasing to act with the advanced republicans, he was guillotined, Oct. 31, 1793.

**Faucille, COL DE LA.** Mt. and pass of France, in the dept. of Ain. They are in the Jura Mts., 16 m. N.W. of Geneva. On the summit of the mountain (4,355 ft.) are two hotels. The pass leads through the valley of the Dappes, which in 1862 was partitioned between France and Switzerland.

**Faucit, HELENA SAVILE** (1820-98). A British actress. She made her first London appearance at Covent Garden, Jan. 5, 1836, as Julia in Sheridan Knowles's *The Hunchback*, and achieved conspicuous success as Juliet, Portia, Constance, Desdemona, Imogen,



Helena Faucit,  
British actress

and Hermione. Macready engaged her as leading lady from 1837 at Covent Garden, The Haymarket, and Drury Lane. Among other parts she acted Cordelia to his Lear, Virginia to his *Virginian* in Knowles's drama, and Pauline to his Claude, Julie to his Richelieu, and Clara to his Alfred Evelyn, in the original production of Lytton's plays, *The Lady of Lyons*, *Richelieu*, and *Money*. In 1851 she married Sir Theodore Martin, who wrote her life, 1900. She died Oct. 31, 1898.

**Fauconberg, BARON.** English title dating from 1283 and now united with that of Conyers.

Walter de Fauconberg, who was summoned to Parliament as a baron in 1283, was the first holder, and the title passed to his descendants until it came in 1362 to Thomas, the 5th baron. He left an only daughter, Joan, who married Sir William Neville, and he, following the custom of the time, became Lord Fauconberg. He was made earl of Kent, but died without sons, and from the time when his widow died (1491) to 1627 the barony was in abeyance. In that year Charles I gave Thomas Belyse the title of Baron Fauconberg, and in 1642 created him a viscount. To those titles his grandson Thomas succeeded in 1652. He was a parliamentarian and married Mary, daughter of Oliver Cromwell. Afterwards he became a royalist and courtier under Charles II. He was made an earl in 1689 and died without sons in 1700. In 1903 the barony was granted to the countess of Yarborough, a descendant of Joan Neville.

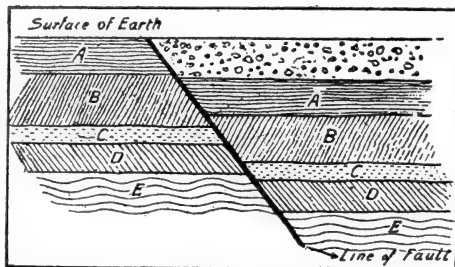
The barony of Conyers dates from 1509 and was held by the families of Conyers and Darcy until 1888. In 1892 an abeyance was ended in favour of the countess of Yarborough. See Holderness, Earl of.

**Fauldhouse.** Parish and town of Linlithgowshire, Scotland. It is 7 m. S.W. of West Calder, on the Cal. and N.B. Rlys. Coal and ironstone are worked, and there is a paraffin industry. Pop. 3,923.

**Faulhorn.** Mt. of Switzerland, in the canton of Berne. It is in the Bernese Oberland, 32 m. S.E. of Berne, between the lake of Brienz and the Grindelwald valley. It is composed of calcareous, friable schist. Alt. 8,803 ft.

**Fault.** In geology, a dislocation of rock-beds due to movements of the earth's crust. Three main types are recognised: normal, reversed, and transcurent. In normal faults the displacement is more or less inclined, rarely vertical. On one side of the line of fracture rock-beds are thrown to a lower level, the amount of vertical displacement being known as the throw, the inclination from vertical being termed the hade.

Normal faults may run in approximately the same direction as inclination of beds (dip faults), or at right-angles to it, that is, coinciding with the trend of the bed (strike-faults). They may be oblique, or occur in groups (step or trough-faults), and intersection of faults often takes place. When dislocation is inclined to the upthrow, the reversed type of fault is produced. Reversed faulting is usually associated with highly inclined or folded strata, and may lead to



**Fault.** Diagram illustrating a fault in the Earth's surface. The relative positions of the letters A, B, B, etc., show the extent of dislocation

development of overthrusts. With transcurrent faulting the movement has been in horizontal direction, and there are neither upthrows nor downthrows. Friction is set up along the planes of all faults, and results in the crushing

and polishing of the opposing rock-surfaces, "slickensides" and "crush-brecias" being produced. See Dip; Earth-movement; Tectonics.

**Faun.** In Roman mythology, a minor nature deity identified with the Greek satyr. See Faunus.

**Fauna.** Term used by naturalists for the collective animal life of any special locality or period, just as flora is used for the plant life. See Animal.

**Faunus** (Lat. *favere*, to favour). In Roman mythology, originally an Italian nature god, whom rationalistic explanations made out to be a prehistoric king. He was the patron of agriculture and of flocks and herds, and had prophetic powers. As the god of flocks, he was known as Lupercus, and the Lupercalia (Feb. 15) was celebrated in his honour. The Faunalia (Dec. 5) was rather a local festival. In art he is represented as a bearded man, with goatskin cape, and bearing a club and a horn.

**Faure, François Félix** (1841-99). French statesman. Born in Paris, Jan. 30, 1841, he made a fortune as a shipowner in Havre. He fought as a volunteer officer in the war of 1870-71, and entered the chamber as republican deputy for Havre in 1881. His knowledge

of commercial and colonial conditions made him prominent, and he was under-secretary for the colonies in Jules Ferry's ministry of 1883, and minister of marine in the ministry of Dupuy, 1894. He was elected president of the republic after Casimir-Périer's resignation, Jan. 15, 1895, defeating

Brissot by 69 votes. An unsuccessful attempt on his life was made, July 14, 1896. The chief events marking his tenure of office were the visit of the tsar of Russia and the conclusion of the Franco-Russian alliance, 1896, and the opening stages of the Dreyfus affair, at a critical point in which Faure died suddenly, Feb. 16, 1899.

**Faure, Gabriel** (1845-1924). French music composer. Born at Pamiers, Ariège, May 13, 1845, he studied in Paris and became organist, first of St. Sulpice, and then of La Madeleine, 1896. Director of the Conservatoire Nationale, 1909-20, he was elected to the Academy of Fine Arts in 1913. Among his works are orchestral poems and suites, a symphony, and a berceuse for solo violin. He died Nov. 4, 1924.

**Faure, Jean Baptiste** (1830-1914). French singer. Born at Moulins, Jan. 15, 1830, he excelled in singing as a boy. After studying at the Conservatoire in Paris, he appeared at the Opéra Comique in 1852, and achieved success in opera in Paris, London, Vienna, and Brussels. He died Nov. 10, 1914.

**Faust.** German scholar of the 16th century whose name has become the centre of a great body of legend and poetry in European literatures. There is good historical evidence for the existence of a real doctor of this name who, during the first half of the 15th century, practised magical arts, and gained wide notoriety as a clever charlatan in various parts of Germany, especially, it is believed, at Cracow. The numerous stories popularly attached to his name were collected anonymously and published by Johann Spiess at Frankfurt in 1587 as *The History of Dr. Johann Faust*, a book



**Félix Faure,**  
French statesman

which went through many editions, translations, and adaptations. In this work the essentials of the story are given as follows:

Faust, weary of the pursuit of learning and worldly pleasures alike, has taken up the study of magic and necromancy. He conjures the devil, who engages to serve him in all he may desire for a period of 24 years, after which he passes into the devil's power. The devil accordingly procures for Faust all sorts of pleasures and supernatural aids to his study of sorcery, alchemy, and philosophy. Faust has occasional fits of repentance, which pass as his servant provides fresh delights; among his lovers is Helen of Troy, a familiar medieval incarnation of pagan delights. When the appointed time expires, Faust dies in an agony of fear, and falls irrevocably into the devil's hands.

The *Tragic History of Dr. Faustus*, the drama by Christopher Marlowe, published in 1604, is the first appearance of the story in serious literary form in England. It was derived from an English version of the Spiess publication, published probably about 1590. Faust is depicted as a young man, enjoying to the full his ill-gotten pleasures; and the devil, Mephistopheles, is a genuinely tragic figure, fallen from heaven and tortured by regret for his lost state. Helen of Troy is conjured up near the end of the tragedy, symbolising, as some hold, the return of ancient beauty in the Renaissance to challenge medieval doctrines.

#### Goethe's Faust

The *Faust* of Goethe, the greatest version of all, is a long verse drama in two parts. First begun in 1773, Goethe did not complete working on it until 1832, a few days before his death, but parts were published in 1790 and 1808. The story is developed on widely different lines from the early Faust books. Faust, inspired by a fierce desire for knowledge and for pleasure, and convinced of the unreality and uselessness of his life, sells himself to Mephistopheles. He seduces and deserts the beautiful Marguerite, who in despair kills her child and is thrown into prison. Faust visits her, and tries in vain to persuade her to flee with him, but she dies in his arms. A voice from Heaven declares that penitence has saved the soul which he had imperilled. This is the central episode in the story, but the Prologue in Heaven describes how the temptation of Faust is undertaken by Mephistopheles as a wager with God, who believes that Faust can withstand his seductions.

In Goethe's second part, the philosophic aspect forms the exclusive interest, although the symbolism is often very obscure. Faust comes to the conclusion that neither learning nor bodily pleasures can satisfy his soul, but only a life of useful activity, contributing to the beneficent works of God and Nature. By this decision his soul is saved from perdition. Goethe has thus transformed the old Faust story, with its stress on the punishment awaiting those who seek human and rational knowledge in preference to theological doctrine, into an expression of the noblest humanism in thought and action.

Faust has also been the subject of a romance by Friedrich Klinger, 1791, of a dramatic poem by Nikolas Lenau, 1836, and used as the basis for operas by Spohr, 1818, Berlioz, 1846, and Gounod, 1859. A tragedy, Faust, by W. G. Wills, based on Goethe's version, was produced successfully by Henry

**Faust Up to Date.** Burlesque written by George R. Sims and Henry Pettit, with music by Meyer Lutz, produced Oct. 30, 1888, at The Gaiety, London, where it ran for 180 performances.

**Fauvette.** British mercantile auxiliary. She was sunk by a mine off the E. coast of England, on March 9, 1916, when two officers and 12 men were lost.

**Favara.** Town of Sicily, in the prov. of Girgenti. It stands at an alt. of 1,100 ft., 5 m. S.E. of Girgenti, and 9 m. from the Mediterranean. It is the centre of a fruit-producing district, and is noted for its rich sulphur mines; other products are marble, alum, and tourmaline. There is a 14th century castle of the Chiaramonti. Pop. 21,599.

**Favart, CHARLES SIMON** (1710-92). French dramatist. Born in Paris, Nov. 13, 1710, he produced his first light opera, *Les Deux Jumelles*, in 1734, with such success that he left his father's bakery



Faustina, wife of the emperor Antoninus Pius

*From a bust in the Naples Museum*

shal de Saxe, when the Favart company was performing in his camps in Flanders, 1747, brought his wrath on her, and a *lettre de cachet* on her husband, the execution of which he escaped. Favart died in Paris, May 12, 1792. See Favart, *L'Opéra Comique*, et la Comédie-Vaudeville aux 17e et 18e Siècles, A. Font, 1894.

**Faversham.** Mun. bor. and market town of Kent, England. It stands on a branch of the Swale, called Faversham Creek, and is 9½ m. N.W. of Canterbury, on the S.E. & C.R. An ancient town, in 1147 Stephen and Matilda founded here a Cluniac abbey, of which traces still exist. In it the royal pair and their son Eustace were buried. The cruciform church of S. Mary of Charity, in the Early English style, restored by Sir G. G. Scott in 1874, contains some superb brasses.

Faversham has a trade in fruit,



Faust. The meeting of Faust and Marguerite, from the painting by J. J. J. Tissot, in the Luxembourg, Paris

Irving at the Lyceum, London, Dec. 19, 1885, revived in 1888, 1894, and 1902. In Oct., 1920, the original version of Goethe's Faust, found by Friedrich Schmidt of Berlin University in a contemporary manuscript copy, was produced in Berlin by Max Reinhardt. *Pron.* Fowst. See Goethe; Mephistopheles. J. E. Miles

**Faustina** (d. A.D. 141). Wife of the Roman emperor Antoninus Pius. His daughter of the same name (d. A.D. 175) married Marcus Aurelius, successor of Antoninus. Mother and daughter were noted for their profligacy, yet their memory was held in honour after their death by their husbands, who founded institutions for the educating of orphan girls called after them *Faustinianae*.

business and turned to playwriting. Under his direction the *Opéra Comique* became the centre of this class of work for many years. A protégé of Madame de Pompadour, he scored other notable successes with *La Chércheuse d'Esprit*, 1741; *Les Moissonneurs*, 1747; *Les Trois Sultanes*, 1761. His wife, Marie Justine du Roncerai (1727-72), was a celebrated actress, whose coldness to the enamoured Mar-



Faversham arms



Faversham. The parish church of S. Mary of Charity, restored in 1874

hops, and agricultural produce, also powder mills, brick and cement works, breweries, and an important oyster industry. The port has a trade in coal, timber, etc. The corporation owns the electric lighting plant, a recreation ground, and a cemetery. Owing to its position at the point where Watling Street touched the river, Faversham was an important place in Anglo-Saxon times, having probably been so in Roman ones. It was a member of the Cinque Port of Dover, had its own mayor and corporation, while its abbot was rich and powerful. It is still governed by a mayor and corporation. A serious explosion occurred at a powder factory here in April, 1916. Market days, Wed. and Sat. Pop. 10,619.

**Favier Explosives.** Original name of ammonium nitrate explosives, and a term by which the class is still generally known. Owing to a number of accidental explosions due to blasting in coal mines, attention was drawn to the suitability of ammonium nitrate explosives for this work, owing to their low explosion temperature, and Favier patented the type in 1884-85, the manufacture being taken up by the French government. The official French explosives generally consist of about 95 p.c. of ammonium nitrate and 5 p.c. of di- or tri nitronaphthalene, for use in fiery mines, whilst the latter ingredient is increased to 12 p.c. for use in others. Ammonite is an English representative of this class.

**Favignana** (anc. *Aegusa*). Island of the Mediterranean, belonging to Italy. It lies off the N.W. coast of Sicily, and is the largest of the Aegades Islands. Favignana, the chief town and fishing port, lies on the N. shore, and has a fortified harbour. Off the island the Carthaginian fleet was defeated by the Romans in 241 B.C. The island is 6 m. long, and rises over 1,000 ft. It is honeycombed with caves. Area, 8 sq. m. Pop. 6,079.

**Favonius.** In Roman mythology, the name of the W. or S.W. wind which blew in spring, identified with the Greek Zephyrus.

**Favorinus.** Greek sophist and rhetorician. A native of Arclate (Arles) and a great traveller, he flourished during the reign of Hadrian. He wrote several miscellaneous works, but none survives.

**Favre, JULES CLAUDE GABRIEL** (1809-80). French statesman. Born at Lyons, March 21, 1809, he entered the legal profession, and, an ardent republican from the first, was elected deputy for Lyons to the constituent assembly, 1848. A bitter enemy of Louis Napoleon,

he attempted an armed riot against his election to the presidency, 1851, defended his assailant Orsini, 1858, led the republican opposition in the chamber, 1863-70; and founded the republican paper, *L'Électeur*, 1868.



**Jules Favre,**  
French statesman

Favre was foreign minister and vice-president, but mismanaged the armistice negotiations, Jan. 28, 1871, and as foreign minister under Thiers, 1871, was easily out-manoeuvred by Bismarck. The treaty of Frankfurt brought about his resignation, July 23, 1871. He was elected to the senate in 1876, and died Jan. 20, 1880. His writings include political studies, and an account (1873-75) of The Government of National Defence, in which he describes his part in the events of 1870-71.

**Favus** (Lat., honeycomb). Disease caused by a parasite fungus, the Achorion Schoenleinii, which most frequently attacks the scalp, but may affect any part of the skin. Favus is common in Eastern Europe and Asia, but is rare in Great Britain. On the scalp it first appears as small, irregular cups of a sulphur-yellow colour. Large scabs are gradually formed which eventually drop off, leaving a depressed scar destitute of hair. The condition is intractable, and may persist for years. The contagion may be derived from rabbits, dogs, fowls, and other animals. Exposure of the patch to X-rays, followed by vigorous treatment with antiseptics, give the best results.

**Fawcett, HENRY** (1833-84). British politician and economist. Born at Salisbury, Aug. 26, 1833, he graduated at Cambridge in 1856, distinguishing himself in mathematics. He was accidentally blinded at a shooting party in 1857, but, taking up his fellowship at Trinity Hall, devoted his time to the study of political economy, of which he became professor in 1863. In 1867 he married Millicent Garrett, a distinguished advocate of women's rights. In 1865 he became Liberal M.P. for Brighton, and took up an independent line which brought him into opposition



**Henry Fawcett,**  
British politician

with every other party. 'Identifying himself with many schemes of reform and devoting himself especially to all questions concerning India, he became known as the member for India. In 1875 he was chosen M.P. for Hackney, and in 1880 became postmaster-general under Gladstone, but without a seat in the cabinet. He introduced several postal reforms. Died at Cambridge, Nov. 6, 1884. See Life, Leslie Stephen, 1885.

**Fawcett, DAME MILICENT GARRETT** (b. 1847). British writer and feminist. Born June 11, 1847. She was the daughter of Newson Garrett, and sister of Mrs. Garrett Anderson. In 1867 she married Henry Fawcett. She became a leading



*Millicent Garrett Fawcett*

Elliott & Fry

advocate of women's suffrage, being president of the national union of women's suffrage societies until 1919. Mrs. Fawcett was known also as a writer on educational and political subjects. Her two text-books, *Political Economy for Beginners*, 1870, and *Tales in Political Economy*, 1875, had great popularity. She wrote *Essays and Lectures*, jointly with Henry Fawcett, 1872; *Life of Queen Victoria*, 1895; *Women's Suffrage*, 1912. She received the G.B.E. in 1925. Her daughter, Philippa Garrett Fawcett, was senior wrangler in fact, though not in name, in 1890. Afterwards she was engaged in educational work.

**Fawkes, GUY** (1570-1606). English conspirator, central figure in the Gunpowder Plot. Born at York, April 16, 1570, he served for some years in the Spanish armies in Flanders from 1593. The circumstances of his implication in the conspiracy were as follows.

In 1604 a small group of Roman Catholic zealots, finding that they had nothing to hope from the accession of James I, formed a plot for the overthrow of the government by blowing up king, ministers, and parliament together; in the resultant chaos, the Roman Catholics, headed by the conspirators, were themselves to seize the government. The secret, imparted to few—Catesby, Percy, Digby, Rookwood, and Tresham are the most familiar of the names of the plotters—was for a long time well kept. The design was to be carried out on the day of the assembling of parliament in Feb., 1605.

But the meeting was adjourned till Oct., and finally till Nov. 5. The conspirators procured an adjoining house which gave them access to the chambers under the Parliament House, where gunpowder was stored, while the actual execution of the plot was entrusted to Fawkes.

But at the critical moment a hint was conveyed by one of the conspirators, Francis Tresham, to Lord Monteagle, warning him to absent himself from the ceremony, since "this Parliament shall receive a terrible blow, and shall not know who hurts them." The meaning of the hint was unexpectedly elucidated; on the night of Nov. 4 Fawkes was found at his post, and was seized after a desperate resistance. The rest of the conspirators fled, but were hunted down and captured or slain. A full confession was extorted under torture from Fawkes, who, with the surviving conspirators, was executed, Jan. 31, 1606.

The share taken in the affair by the Jesuits is a matter of dispute, but two of them, Gerard and Garnet, the head of the order in England, certainly knew of the plot, though the latter is said to have received his information only under the seal of confession. The effect of the plot was to establish in the minds of the English people an unreasoning and persistent fear and hatred of the Roman Catholics; though none but a few desperate fanatics had been in any way concerned. See Gunpowder Plot.

**Fayal** or **FAIAL**. Island of the Azores, belonging to Portugal. It lies W. of Pico. Almost wholly mountainous (highest point 3,300 ft.), it is fertile, cereals, fruit, and vegetables being cultivated. The fig tree flourishes, and from its pith carvings are made; lace is made from the agave. Basket-making is carried on, but the so-called Fayal wine was made in the neighbouring island of Pico. The capital and chief port is Horta, with a wireless station. Area, 65 sq. m. Pop. 22,385.

**Faye**, **HERVÉ AUGUSTE ÉTIENNE** (1814-1902). French astronomer. Born at St. Benoît-du-Sault, Indre, Oct. 5, 1814, he was made professor of astronomy at Nancy in 1854. In 1873 he was appointed professor of astronomy and geodesy at the École Polytechnique in Paris. He discovered the comet named after him, Nov. 22, 1843. It has a period of 7½ years, and pursues the most nearly circular path of any known object of the kind. His name was associated with the cyclonic theory of sunspots, with the nature of, and velocities in, prominences. He died in Paris, July 4, 1902.

**Fayolle**, **MARIE ÉMILE** (b. 1852). French soldier. Born at Le Puy, Loire, May 14, 1852, he entered the French army as a lieutenant of artillery in 1877, and saw active service in Tunisia. He was later a professor in the École Supérieure de Guerre, became colonel 1907, and general 1910.



Emile Fayolle, French soldier

At the outbreak of the Great War he was in command of the 139th brigade, and then, after leading a division, commanded the 33rd army corps. Succeeding Castelnau, he led the French Sixth and First Armies in the battle of the Somme, 1916. In 1917 he commanded the Army of the Centre, which took part in the Aisne battles. In Oct., 1917, he was in Italy as commander-in-chief of the French forces. In 1918 he returned to France and was placed at the head of the reserve army. For a time, in 1919, he commanded the French Army of Occupation in Germany. In 1920 he was appointed French military representative on the permanent armaments commission of the League of Nations.

**Fayum** (Coptic, lakeland). Prov. of Upper Egypt. It contains the districts of Etsa, Fayum, and Sennures. The district of Fayum consists of a nearly circular basin, well irrigated and fertile, sunk below the level of the surrounding desert. In it are Lake Moeris and the town of Medinet-el-Fayum. The chief products are rice, cotton, flax, hemp, figs, olives, and oranges. The prov., which is watered by the Bahr Yusuf, an old Nile branch, abounds in ancient remains, its sites having been dug by Flinders Petrie mainly between 1888-90. The area of the prov. is 669 sq. m. Pop. 507,617.

Its overflow was embanked by Amenemhat III, who built a funerary temple, known in ancient times as the Labyrinth, two colossal statues on limestone pedestals, and the Hawara pyramid. Adjacent Roman tombs have furnished many mummy-portraits. Senwosri II erected the Illahun pyramid. At Gurob precious papyri were re-

covered from mummy-wrappings; other papyrus collections have come from Arsinoë and elsewhere.

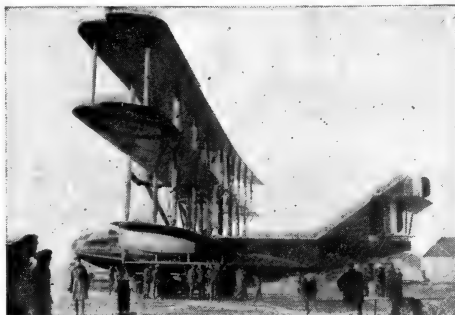
**Fazakerley**. Suburb of Liverpool. It has a station on the L. & Y. Rly. and is also connected with the centre of the city by tramways.

**Fazogli** or **FAZOKL**. Region of the Anglo-Egyptian Sudan. It is intersected by the Blue Nile and borders Abyssinia on the S. and E. The inhabitants are negroes, but there are Arab settlements. The chief town is Famaka. Gold, ivory, gum, and fruits are exported, and tobacco and durra are produced. Pop. (est.) 500,000.

**F.B.A.** Abbrev. for Fellow of the British Academy (*q.v.*), an important learned society.

**F.B.A.** Name of a two-seater flying boat manufactured by the Franco-British Aircraft Co., fitted with a 100-h.p. Gnôme engine. It was 45 ft. in breadth and 28 ft. in length, and was used during the Great War for patrol work and submarine spotting.

**F Boat**. Name given to a class of flying boats developed by the Felixstowe experimental seaplane station of the R.N.A.S.—later



F Boat. The Felixstowe Fury triplane flying boat, a development of the earlier F boats. See page 3107

R.A.F. The types F 2, F 2A, F 3, and F 5 were built in considerable numbers by various contractors, and were extensively employed in the Great War for anti-submarine patrols. These four types were all biplane flying boats of large size, fitted with two Rolls-Royce engines from 250 to 375 h.p., carrying generally a crew of five, a formidable machine-gun armament, and a large load of bombs. See Felixstowe Fury.

**F.E.** Name of a type of British aeroplane built at the Royal Aircraft Factory, Farnborough, later known as the Royal Aircraft Establishment. The letters originally indicated Farman Experimental. It was a pusher biplane, and was named after Henry Farman, who was credited with having originated the pusher type.



**Feale.** River of Ireland. Rising in N.W. co. Cork, it passes N.W. between cos. Limerick and Kerry and thence W. through co. Kerry to the Shannon, which it enters as the Cashen. Its length is 37 m.

**Fear.** Feeling of mental uneasiness arising from the expectation of evil to come. Exercising a disturbing and lowering effect, it drives the blood to the heart, giving rise to paleness and accelerated heart-beat; perspiration exudes from the skin, the hair stands on end. The eye, on the other hand, is stimulated. The aggravated form of fear is terror; a modified form is known as shyness. See Emotion Psychology.

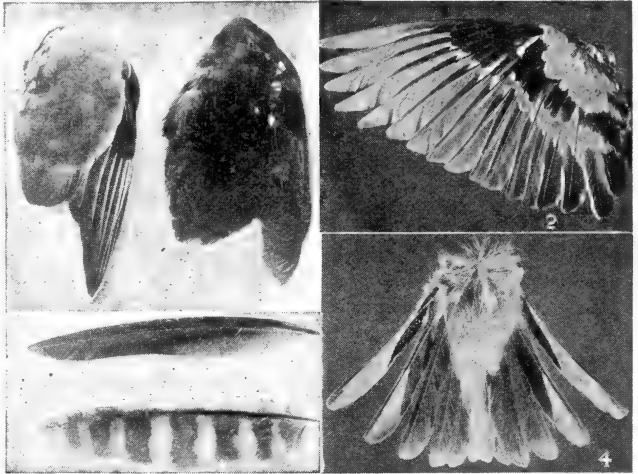
**Fear.** Cape or headland of North Carolina, U.S.A. It is the extreme S. point of Smith's Island and of the state. A lighthouse has been erected on the point.

**Feast.** Term applied to days on which notable events in Church history, giving occasion for solemn joy, are commemorated. From this has developed its use for occasions of rejoicing in public or private; for public dinners, e.g. mayoral or civic feasts, etc. See Festival.

**Feather.** Outgrowth from the skin in birds, forming an external protective covering. They do not occur in any other phylum of the animal kingdom, their place being taken by hair in the mammals. Feathers are of a horny character, and are composed structurally of an axis and a large number of barbs. The hollow base of the axis is fixed in the skin, and is known as the quill. The small hole at its base is the opening through which nutrition is supplied during growth. The solid upper part of the axis is called the shaft, from which branches or barbs grow out on either side. These barbs have smaller branches or barbules, which interlock and so resist the pressure of the air in flight. In flightless birds, as the ostrich, the barbules do not interlock, and the feathers are soft and loose.

Although the body of a bird appears to be pretty uniformly covered with feathers, it is not really so. The feathers grow in definite tracts, and certain portions of the body are without them. Feathers are of many types, the strongest being the flight feathers on the wings. Small soft feathers, known as down, form an underlayer for purposes of warmth, and are most developed in the water-fowl. In some species, as the birds of paradise, certain feathers are modified to produce plumes and crests of varied form.

Economically, feathers were formerly much used for stuffing



Feather. 1. Left, wing of wood pigeon; right, of tawny owl. 2. Wing of chaffinch. 3. Primary feather of tawny owl; above, of wood pigeon. 4. Tail of male chaffinch

beds, quilts, and cushions, especially the down of the eider duck, but have now largely given way to more sanitary materials. They are much employed for personal adornment, and the larger quills are still to some extent used as pens. For long an agitation has been carried on against the wearing of feathers obtained from birds



Feather of common owl

of plumage. A Plumage (Prohibition) Bill to prohibit the importation of the plumage of birds and the sale or possession of plumage illegally imported was introduced into Parliament in 1920. (See Ostrich; Plumage.)

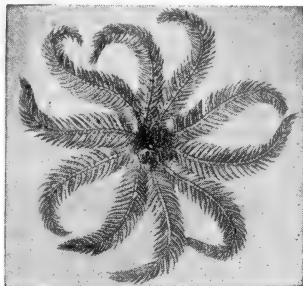
The preparation of feathers for the market includes cleaning, blanching, dyeing, and curling or bending to some required shape. The most important decorative feather is taken from the wings of the ostrich, being cut—close to the root—about three times in two years; the root either falling out or being extracted later. The feathers are sorted according to size, colour, and quality, are well washed, and sometimes dipped in strong starch, then shaken together in bundles in the hot sun until quite dry. Burning sulphur is sometimes used in purifying them. All but feathers which are to be dyed black need blanching, by which cape feathers from the male bird can be made perfectly white.

Stiff feathers have the quill scraped with glass to make them more pliable. Dyeing follows blanching, and the last process is curling the filaments according to the fashion in vogue with a blunt knife. Sometimes they are glycerined instead of curled, and under those conditions they present a lank, thread-like appearance.

**Feather.** River of California, U.S.A. Rising in many head-streams in the Sierra Nevada range, it flows S.W. and S. to the Sacramento river about 20 m. above Sacramento city. Over 230 m. long, it is navigable for only 30 m. Its basin contains valuable gold deposits, which are extensively worked.

**Feather Grass** (*Stipa pennata*). Perennial grass of the natural order Gramineae. A native of Europe, it was long cultivated in gardens as an ornamental plant. The glume containing the seed is covered with stiff hairs pointing upwards, whilst its base terminates in a sharp point. Above it is continued as a long, spirally twisted awn, ending in a long feather-like tail, the whole being about 1 ft. long. The wind acting on the glume detaches the seed, etc., from the plant, and when it reaches the earth the spiral, by expanding in dry and contracting in wet weather, forces the seed into the ground, the bristles on the glume allowing it to enter but preventing its return. If these seeds get into the fleece of sheep they are driven by the same mechanism into the flesh of the animal. Two allied species, *S. capillata* (Russia) and *S. spartea* (N. America), are known to kill sheep in this manner.

**Feather Star.** Class of the Echinodermata (*q.v.*), otherwise known as sea lilies. They resemble very



Feather Star. Specimen of rosy feather star, *Comatula rosacea*

slender starfish, with long rays bearing little branches or pinnules, somewhat like feathers. They live in deep water. Only one species, the rosy feather star, occurs around the British coasts. See Crinoidea.

**Featherstone.** Urban district and parish of Yorkshire (W.R.). It is 2 m. S.W. of Pontefract, on the L. & Y.R., and is a coal-mining centre. The place is specially known because, during a strike, there was a riot here, Sept. 7, 1893. Colliery works having been destroyed, the military arrived, and order was not restored without bloodshed. Pop. 14,374.

**Feathertop.** Mt. of Victoria, Australia. It lies N. of the Dividing Range and rises to 6,303 ft.

**Featherweight.** Literally a weight absolutely exact, so much so that the addition of a feather would make it wrong. The term is used in racing for the lightest weight that can be carried by a horse in a handicap race. In boxing it refers to the lightest class but one of competitors in a recognized competition. Under English rules such must not exceed 126 lb. in weight; under American rules the figure is 115 lb. See Boxing; Handicap.

**Febrifuge** (Lat. *febris*, fever; *fugare*, to put to flight). Term used for any medicine that cures or attempts to cure fever. Antipyrin and phenacetin are febrifuges, while quinine is another in frequent use.

**Febris.** In Roman mythology, the personification of fever and also the goddess who was supposed to avert it. Three temples in Rome, one on the Palatine, were sacred to her.

**Febronianism.** Reform movement among the Roman Catholics of Germany. It was started in 1763 by Johann von Hontheim, who wrote under the name of Justinus Febronius. Its object was to limit

the autocratic power of the pope and to secure a larger measure of independence for national churches.

**February.** Second month of the Christian calendar, ordinarily consisting of 28 days, in leap year of 29. The name comes from Latin *februare*, to purify, in allusion to the Lupercalia (*q.v.*), the Roman expiatory festival, which, as well as the Feralia, or general festival of the dead, was celebrated at Rome during this month. The month is popularly known as February "fildyke." January and February were additions to the old Roman calendar. See Calendar.

**Fécamp.** Town and seaport of Normandy, France. It stands on the English Channel, at the mouth of the river Fécamp, 28 m. N.N.E. of Havre. The port, which has a harbour and docks, has a trade in coal, timber, etc.; it is also a fishing centre. There are some industries, mainly shipbuilding, and here is made the liqueur called benedictine.

The most interesting building is the church of the Trinity, built in the 12th century, once the abbey church. A magnificent building, it has a spacious and noble interior, while it has some fine memorials and decorations, tombs, stained glass, etc. S. Etienne is a 16th century church, while the remaining monastic buildings are now used for the town hall, library,



Fécamp. Sea front looking north-east towards the harbour

and museum. The town grew up around a nunnery founded in the 7th century to hold a relic of the True Blood, which was washed ashore in the trunk of a fig tree. Hence the name, a corruption of *figus campus*. Pop. 15,380.

**Fechner, GUSTAV THEODOR** (1801-87). German philosopher and physicist. Born near Muskau, Prussia, April 19, 1801, he was professor of physics and afterwards of philosophy in the university of Leipzig. The founder of psychophysicism, he held that all mental changes were accompanied by a parallel change in the nervous

system. His chief scientific works are *The Supreme Good*, 1846, and *Elements of Psychophysics*, 1860. Fechner was also the author of a number of satirical writings on various subjects, published under the name of Dr. Mises. He died Nov. 18, 1887. See Psychophysics.



Gustav Fechner, German philosopher

**Fechter, CHARLES ALBERT** (1824-79). British-French actor. Born in London, Oct. 23, 1824, he was a sculptor before he went on the French stage in 1844. He soon became recognized as the leading



French *jeune premier*, notably by his Armand Duval in Dumas fils's *La Dame aux Camélias*, 1852. He appeared at The Princess's, London, Oct. 27, 1860, as Ruy Blas in a version of Hugo's play, with great success. His Hamlet, March 20, 1861, was enthusiastically received; but his Othello, Oct. 23, 1861,

proved disappointing. From 1863-67 he was lessee of The Lyceum, where he played in various melodramas, such as *The Duke's Motto*, *The Roadside Inn*, and *The Corsican Brothers*. In 1870 he appeared in New York. He finally left England in 1872, remaining in America until his death, Aug. 5, 1879.

**Feckenham, JOHN** (c. 1515-84). Last abbot of Westminster. Born about 1515 at Feckenham, near Droitwich, he became a Benedictine monk at Evesham. He was rector of Solihull, Warwickshire, and was confined in the Tower by Cranmer, 1549-53. When Mary restored the monastery of S. Peter at Westminster he was chosen abbot. At the accession of Elizabeth he refused to acquiesce in the reformation of the Church, opposing the new liturgy and the Act of uniformity, 1559. The monastery was soon afterwards dissolved and Feckenham lived in retirement.

**Feddan.** Modern Egyptian land measure. The feddan is 1·038 acres, but in certain localities it is equivalent to 1·127 acres, whilst formerly it equalled as much as 1·266 acres. The measure is divided into 24 kirats.

**Federalism** (Lat. *foedus*, a league). Form of government generally distinguished from the unitary organization of a state. The federal form of government involves limitations upon the power of the central government of a sovereign state, and fairly large units of subordinate government. Thus a federal state is distinguished from a confederation of states in having a powerful, though limited, central government; and federal units are distinguished from units of local government in being large and controlling elements in the governmental organism.

Federation means either the character of the government in a federal state, or the political movement towards decentralization; and thus it may be best explained by reference to the practice of federal governments. Such governments may be formed either by the unification of diverse units, as in Switzerland and the original United States of North America, or by decentralization of a single unit of government, as in the case of the Dominion of Canada. The federal states of South and Central America vaguely reflect both methods of formation.

The subordinate elements in a federation are sometimes called states, as in N. and S. America, and sometimes called by other names, as cantons in Switzerland. The idea of subordination, however, is not quite adequate, for the distinction between the functions of central and non-central government in a federal state is not one between a superior and an inferior. The distinction is based on a division between equally important functions.

The non-central governments generally deal with industrial issues of a localised character, with education, with taxation or a large part of it, with roads and summary justice; the central governments deal with peace and war, foreign or international affairs, basic administration of justice, and communication. Clearly the way in which the functions are divided must vary with the peculiar circumstances or the history of the people concerned, and where there is an increase of governmental functions there may be disputes as to the competence in particular issues of the central and the non-central governments. Thus the state of California in U.S.A. may make the

foreign policy of the central government difficult by excluding some Japanese.

In the United Kingdom federalism would involve the partial separation of the old kingdoms and the principality of Wales, with a view to decentralizing some parts of the administration; and it is therefore connected with devolution. The tendency in the great states of modern times is towards federation because of the separation between a highly centralized machine of government in a large population from the necessary contact with local differences. Thus, while in the United Kingdom there is only one Parliament and executive for about fifty million persons, in the Scandinavian States there is a complete organism of government for about five million. The tendencies point to changes of the older form of federal government, e.g. in the U.S.A., and to experiment in new forms. See Devolution; Home Rule; Politics; Sovereignty; State.

**C. Delisle Burns**  
*Bibliography.* History of Federal Government, E. A. Freeman, 1863; The American Commonwealth, J. Bryce, 1888; The Federal Solution, J. A. Murray Macdonald, 1920.

**Federalists.** American political party formed in 1787. When the thirteen British colonies of N. America were recognized as an independent nation in 1783, the most urgent problem before them was the provision of a common central government which at the same time should not interfere with the autonomy of the several states. The practical result was that politicians were grouped into two parties with an indefinite line of demarcation—the Federalists, who emphasised the necessity for strengthening the authority of the central government, and the anti-Federalists, who emphasised the rights of the individual states. Since the individual interests of the northern states clashed with the individual interests of the southern states, while if representation rested upon population and wealth the north would dominate the central government, the northern politicians became roughly identified with the Federalists, the southern with the anti-Federalists.

Washington, as president, did not wish to identify himself with a party; Hamilton, the leading Federalist, and Jefferson, a prominent anti-Federalist, served under him in the same government. But at bottom the real question was whether the interests of the N. or those of the S. should predominate. The series of presidents from Jefferson onwards were anti-Federalists—mainly a consequence

of want of solidarity among the Federalists and of the popular anti-British policy of the anti-Federalist statesmen. The Federalist party broke up and disappeared after the "Hartford Convention," which was held by the Federalist states of New England in 1814, with the somewhat paradoxical aim of organizing defence against encroachments upon the rights of the northern states, while it was strongly suspected of really aiming at the separation of the New England states. See United States; History.

**Federated Malay States.** Name given to a federation of native states under British protection in the Malay Peninsula. There are four of them—Perak, Selangor, Nigri Sembilan, and Pahang, and the seat of government is at Kuala Lumpur. The states have an area of 27,500 sq. m. and a pop. of about 1,000,000. Each state has its own sultan and a British resident, while over them is the British high commissioner. Large quantities of tin and gold are mined in these states, and dense forests yield valuable timber. See Nigri Sembilan; Pahang; Perak; Selangor.

**Federation of British Industries.** British organization of manufacturers. Established in 1916 as a central organization of manufacturing interests, its main object is to decide upon and carry into effect a definite line of policy in regard to various matters affecting British industry. It seeks to expand and develop overseas trade by means of ambassadors of commerce. It has a large membership, representing millions of industrial capital. It was incorporated by royal charter in 1923. The headquarters are at 39, St. James's Street, London, S.W.

**Fee.** Payment made for services, especially of a professional kind. The fees of doctors, lawyers, architects, and others are usually settled by custom, although as regards solicitors a maximum scale of fees is fixed by the Law Society. The fees of barristers, being originally honoraria, are not recoverable in a court of law. Fees vary very considerably, more especially those of medical men and lawyers. Those of architects, surveyors, and the like are generally arranged on a percentage basis. The charge made for entrance to societies, clubs, etc., also the right to sit at examinations, is called a fee.

**Feeder.** Main lead or conductor from an electric generating station which runs direct to a point or district to be served without supplying intermediate points. A positive feeder is that connected to the positive terminal of the generator or

battery; a negative feeder is connected to the negative terminal. A neutral feeder is a common conductor which completes two separate circuits from a pair of dynamos coupled in series. See Circuit; Dynamo.

**Feeding Stuffs.** Food for cattle, which may be roughly divided into five classes: (1) Oil seeds such as cotton cake, linseed cake, rape, palm-nut, coconut and earthenut cakes; (2) leguminous crops, such as peas, beans, lentils, malt, dried grains, etc.; (3) cereals, including wheat, barley, oats, maize or Indian corn, rice; (4) grass and hay; (5) root crops, such as swedes and mangolds, potatoes, carrots, kohlrabi, etc.

The oil cakes so largely used as winter feed for cattle are valuable, not only for the oil which they contain, but also for their albuminous matter. Linseed cake contains from 9 p.c. to 13 p.c. of oil, and 26 p.c. to 30 p.c. of albuminoids. Decorticated cotton cake may contain 40 p.c. to 45 p.c. of albuminoids. Besides oil and albuminoids, a good sample of linseed cake holds valuable carbohydrates as well as a certain amount of mineral matter not without value. The value of oil cakes does not depend upon the amount of oil which they contain. Samples of linseed cake and of rice meal may each contain 13 p.c. of oil, yet while the linseed oil is highly esteemed, that in the rice meal is considered of very slight value. Beans and peas are among the most valuable of feeding stuffs, the reason being that they contain from 50 p.c. to 55 p.c. of starchy bodies as well as from 20 p.c. to 24 p.c. of albuminoids.

Of the cereals, maize contains as much as 70 p.c. of starch; rice, at the other end of the scale, containing 50 p.c. Grass, clover, cabbage, tares, etc., are valuable principally for their succulent qualities. With these may be included brewers' grains, so largely given to cows in milk. The bulky dry foods, such as hay and straw, are valuable chiefly for their fibre, while the root crops are useful on account of their sugar and their easily digested carbohydrates. Sugar has a rapidly fattening effect upon stock, and of late years a large amount of molasses, from both cane and beet, has been used in the manufacture of artificial feeding stuffs.

The Fertilisers and Feeding Stuffs Act passed in 1906 was designed to protect the farmer against frauds in connexion with the sale of these articles. The seller of any artificially prepared article of food for cattle or poultry is bound to

give the purchaser an invoice stating the substances or seeds from which it has been prepared, and the percentages (if any) of oil or albuminoids contained in it. See Agriculture; Cattle; Farm.

**Feeler.** Name given to the antennae or other similar organs of insects. The word is also used for a lever on a loom, and for the jaws of a measuring instrument. See Antennae.

**Feeling.** Act of perceiving by one of the five senses, more particularly the sense of touch and the sensations produced by it. Feelings again have been divided into skin sensations, which are referred to external things, and organic sensations, which are referred to ourselves, and are accompanied by an element of pleasure or pain. Among organic sensations are hunger, thirst, disgust, cheerfulness, depression. Psychologically, feeling is distinct from sensation. Sensation is always preceded by an organic impression; not so feeling, which only manifests itself in the body by virtue of the natural reaction of the mind on certain organs. Various classes of feelings are suggested: sensual and intellectual, material and formal. Some psychologists admit only two qualitative differences of feeling—pleasure and displeasure; others six—pleasure, displeasure, tension, relaxation, elevation, depression.

**Fee Simple** (Lat. *feodum simplex*). Highest estate known to English law. A tenant in fee simple is what is popularly styled a freeholder. Though in theory the sovereign is the lord paramount, the freeholder can grant his land away or devise it to whomsoever he likes by will. An estate in fee simple must be granted by deed and a peculiar form of words, except in a will where words are more widely construed than in deeds. See Land Laws.

**Fee Tail** (Lat. *feodum talliatum*, limited). Form of freehold estate set up originally by the Statute De Donis, 1285, by which a grant to X and the heirs of his body gave X an estate tail. This estate would last only as long as X has heirs of his body, and would then revert to the grantor. This led to Fines and Recoveries, tortuous legal fictions by which the estate became fee simple. In 1833 a new Act was passed by which, by a deed enrolled, X could convert his holding into a fee simple. The holder of a fee tail cannot dispose of it by will.

**Fehling's Solution.** Alkaline solution of copper used for the detection of sugars. Solution No. 1 is prepared by dissolving 34.65 grams of pure copper sulphate in distilled

water and diluting to 500 c.c. Solution No. 2 is made by dissolving 50 grams of sodium hydroxide containing not less than 97 p.c. of the salt, and 175 grams of recrystallised Rochelle salt in about 400 c.c. of water, and afterwards diluting to 500 c.c. When required for use equal volumes are mixed together.

**Fehmarn** or **FEMARN.** Island in the Baltic Sea, belonging to Germany. Area, 70 sq. m. It lies off the E. coast of Holstein, from which it is separated by the narrow Sound of Fehmarn and from the island of Laaland on the N. by the Fehmarn Belt. The surface is level and the soil fairly fertile. Its few harbours can only accommodate vessels of shallow draught. Agriculture, fishing, and the rearing of cattle and sheep are the main occupations. The only manufacture of importance is hosiery. The capital is Burg. Prussia annexed the island in 1866 as a result of her victories over Denmark and Austria. Pop. 10,000.

**Fehmarn Belt.** Channel between the islands of Fehmarn and Laaland, Denmark. It has a width of about 12 m., and leads from the Baltic to Kiel Bay. Fehmarn Sound is a narrow passage between the island of Fehmarn and the mainland.

**Fehmgericht** or **VERMERICHT** (Ger. *Fehm*, a criminal court; *Gericht*, judgement). Medieval German tribunal. Known sometimes as the Holy Vehme, it exercised power, especially in Westphalia, in the 14th and 15th centuries, and is believed to have been a survival from the jurisdictions of the Saxons. The courts were open for trial of civil matters, but might be secret in special cases. It has been estimated that, in the 14th century, the members (*Schöffen* or *Freischoffen*), bound by an all-embracing oath of fidelity, numbered about 100,000.

The government of the tribunal was vested in a chapter presided over by the emperor or his deputy, called the *Oberstültherr*, before whom all members were liable to account for their acts. It had affinity with the process of summary jurisdiction in Anglo-Saxon England, those found guilty of capital offences being hanged, a dagger bearing the secret letters S.S.G.G. being placed on the corpse. As civilization progressed its power waned, to some extent through abuse. The Fehmgericht existed in attenuated form down to the middle of the 18th century, and was finally suppressed by Jerome Bonaparte in 1811. See Introduction, Anne of Geierstein, W. Scott, 1831; On the Rise and Progress of the English Common-

wealth, F. Palgrave, 1832; Die Feme, T. Lindner, 1887; Das Femgericht Westphalens, P. Wigand, 1893.

**Fehrbellin.** Town of Germany, in Brandenburg, 40 m. N.W. of Berlin. It is famous for the great victory gained by the Prussians, or, as they were then, the Brandenburgers, over the Swedes, June 18, 1675. A monument marks the site of the battle, which the Prussians regard as a memorable one. It was the beginning of Prussia's military power, as till then the Swedes had been considered all but invincible.

**Feilding.** Town of New Zealand, in North Island. It is 90 m. by rly. N.N.E. of Wellington, and is the centre of an agricultural and pastoral district, carrying on butter and cheese making, saw and flour-milling. Pop. 3,483.

**Feilding, SIR GEOFFREY PERCY THYNNE** (b. 1866). British soldier. Born Sept. 21, 1866, a son of Sir



Sir Geoffrey Feilding.  
British soldier  
Russell

Percy Feilding, he belonged to the family of the earl of Denbigh. From Wellington College he entered the Coldstream Guards in 1888, and with them

served through the S. African War, where he won the D.S.O. When the Great War broke out, Feilding, as lieutenant-colonel, led one of the battalions of Coldstreamers to the front and was wounded. He commanded the 1st brigade of the Guards division at the battle of Loos, and later was promoted to the command of the division. He was in command of the London district, 1918-1920, and was knighted in 1919.

**Feilding, ROBERT** (c. 1651-1712). English rake, called Beau Feilding. A member of the Denbigh family, he led a regiment in Ireland for James II. After squandering the fortune of his first wife, a daughter of the 1st viscount Carlingford, he married a daughter of the 1st marquis of Clanricarde. After her death he married, in 1705, Mary Wadsworth, represented to him as a wealthy widow, and in the same year also married the duchess of Cleveland, Charles II's former mistress. In 1706 he was convicted of bigamy. Feilding was satirised by Steele and Swift. He died May 12, 1712.

**Feira de Santa Anna.** Town of Brazil, in the state of Bahia. It is about 30m. N.W. of Cachoeira,

on the Bahia-S. Francisco Rly. The centre of a region rich in minerals, it produces marble, gold, and diamonds. There is trade in cereals, tobacco, and cotton. Cattle fairs are held. Pop. 16,000.

**Feis.** Irish word for an assembly. Something like the folk moots of the Anglo-Saxons, these were mainly meetings for the promulgation of laws by the kings, but they had also a festive element. They were frequently held in Ireland, some being national and others local. The most noted was the feis held regularly at Tara for several centuries until 560. Over it the supreme king presided. The word is still in use; for instance, in 1897 a *feis ceoil* was founded to encourage Irish music.

**Feisal** OR **FEISUL** (b. 1887). King of Irak. The third surviving son of Hussein, king of the



Feisal.  
King of Irak  
Russell

Hedjaz, he was born in Arabia, but left it when five years old. He spent the next 18 years in Constantinople, where he received a modern education and, later, appointments under the Turkish government. Along with his brothers, Ali and Abdulla, he took a leading part in the movement which led to the deposition of Abdul Hamid. He commanded the Arab contingent in the Turkish campaigns in the district S. of Mecca, against a new religious sect which was threatening the stability of the emirate of the Hejaz which had been restored after the downfall of Abdul Hamid.

When, in June, 1916, his father sided with the Allies against Turkey, the Emir Feisal commanded the rebels in Medina, but was defeated by the Turks. He then presented to the British a scheme for the formation of an Arab regular army. This was accepted and Feisal's army eventually formed Allenby's right wing in Palestine. His services in the conquest of Palestine and Syria were rewarded with the privilege of setting up in eastern Syria (Amman, Damascus and Aleppo) a provisional military administration which was guaranteed to the Arabs as an independent sphere by the Sykes-Picot Treaty. In March, 1920, he was made king of Syria, but owing to his failure to recognize the rights of France in Syria, he was deposed by Gen. Gouraud, the latter entering his capital, Damascus, on July 25. Feisal became king of Irak in Aug.,

1921. See Arabia; Damascus; Hejaz; Lawrence, T. E.; Palestine, Conquest of.

**Felahiyyeh.** Village of Mesopotamia. It stands on the N. bank of the Tigris, 5 m. from Sanna-i-Yat, and about 25 m. W. of Kut. It was prominent in the earlier stages of the campaign in Mesopotamia, and was captured by Goringe, April 4, 1916. See Es-Sinn, Attack on; Kut, Battles of; Mesopotamia, Conquest of.

**Felanitz** OR **FELANICHE.** Town of Spain, in the island of Majorca. It stands in a mt. valley, 28 m. S.E. of Palma, and 5 m. from its port, Puerto Colon. On the mt. of Puig de San Salvador, in the vicinity, is a Moorish castle with underground vaults. The church of San Miguel is a fine building. Brandy is distilled and soap manufactured. There is trade in cattle, wine, fruit, and earthenware, the water coolers of Felanitz having been noted from the 3rd century B.C. Pop. 11,223.

**Félegyháza** OR **KISKUNFÉLEGYHÁZA.** Town of Hungary, in Little Kumania. An important rly. junction, it is 70 m. S.E. of Budapest. It has a handsome town hall, and a large church. The town is noted for its cattle markets, while there is considerable trade in cereals, wine, tobacco, and fruit. The town was sacked by the Turks in the 16th century. Pop. 34,924.

**Felidae** (Lat. *felis*, cat). Family of the carnivora, or flesh-eating mammals, which includes the cat-like animals. They comprise only two genera, but a large number of species, and are generally regarded as the typical carnivores, being the best adapted for catching and preying upon living animals, and, with the exception of the weasels, the most lithe and active of the order.

They are provided with finely developed canine and carnassial teeth and their sharp claws are retractile. One marked feature of the family is the short and rounded muzzle, which is in conspicuous contrast with the long and sharp muzzle in the dogs. Their fur is soft and often handsomely marked, and their feet are provided with cushion-like pads which enable them to move about silently. All are of savage disposition, and only two species have been domesticated with any success. See Cat.

**Felix** (d. c. 647). English saint and bishop. A native of Burgundy, he came to England, and, helped by Sigebert, king of E. Anglia, preached Christianity. He became bishop of Dunwich, and is said to have founded the monastery at Soham. His name survives in Felixstowe, Suffolk.



**Felix.** Name of four popes and five anti-popes, of whom the following are notable. Felix I (d. 274) is entered in the Roman martyrology probably in mistake for a Roman martyr of the same name buried on the Via Aurelia. A letter of the pope's in response to a report by the Synod of Antioch, which had deposed its heretical bishop, Paul of Samosata, was made use of at the council of Ephesus (431). To Felix I, who reigned 269-74, was attributed a decree for the celebration of masses over the tombs of the martyrs. His festival is kept May 30.

Felix II, pope from 355-58, was a Roman archdeacon who was intruded into the papal chair on the banishment of pope Liberius by the emperor Constantius. On the return of Liberius, Felix was exiled and lived in retirement until his death, Nov. 22, 365. Felix III, pope from 483-92, was chiefly engaged in conflicts with heretical bishops at Alexandria and Antioch. He finally excommunicated Acacius, patriarch of Constantinople, and this schism lasted until 518. Felix IV, pope from 526-30, was the nominee of Theodoric the Goth. He obtained an edict from Theodoric's successor ordering all charges against the clergy to be taken to ecclesiastical courts.

Felix V, anti-pope, was born at Chambéry, Dec. 4, 1383. He reigned as duke Amadeus VIII of Savoy from 1416-34, when he retired in favour of his son. In 1439 the remnant of the council of Basel elected him as pope, although he was not in orders, in place of pope Eugenius IV, whom they declared deposed. As Felix V he was crowned in July, 1440. He never obtained general recognition, but with some show of a following, especially in Switzerland and Savoy, he held his position till 1449, when he abdicated. He died at Geneva, Jan. 7, 1451, last of the anti-popes.

**Felix Antonius.** Brother of the freedman Pallas, minister of the Roman emperor Claudius. He was procurator of Judaea, but was recalled in A.D. 62 to answer charges of oppression made against him by the Jews. It was before Felix that S. Paul preached at Jerusalem (Acts 23, 24).

**Felix Holt** THE RADICAL. Novel by George Eliot, first published in 1866. It presents in broad effect the life of a midland county during the 1832 Reform period, but there is something unreal about the central figure, who is too philosophical and cold-blooded to represent the enthusiastic reformer of that time.

**Felixstowe.** Seaside resort, urban dist. (Felixstowe and Walton), and parish of Suffolk, England. It stands on the estuary of the Orwell, 10 m. from Ipswich.



**Felixstowe arms** yacht pond. and golf links are among its attractions. It has a small dock and a wireless telegraphic station. Phosphate of lime is produced for export. Numerous Roman remains have been discovered. The corporation owns the electric light undertaking and pleasure grounds. During the Great War the Germans made an air raid upon the place, July 22, 1917, which was attended with loss of life. Pop. 11,655.

**Felixstowe Fury.** Name given to a large flying-boat designed by Col. J. C. Porte. A triplane with five Rolls-Royce engines, each of 375 horse-power, it had a span of 123 ft., an over-all length of 60 ft. and a height of 27 ft. 6 in. After many successful flights the machine was wrecked, Aug. 11, 1919, when starting on a test flight with a heavy load, preparatory to a journey to Egypt. See *illus.* p. 3101.

**Fell** (Scand. fjeld, mountain or rock). Term occurring in the names of many British mountains, e.g., Cross Fell, Goat Fell, Hart Fell, Snaefell. See *Mountain*.

**Fell, John** (1625-86). English pedagogue and divine. Born June 23, 1625, he was educated at Christ Church, Oxford, of which he became dean in 1660. Vice-chancellor of the university from 1666-69, he was appointed bishop of Oxford in 1675. He notably improved the buildings as well as the discipline of his college, and is chiefly remembered by some lines "I do not love thee, Dr. Fell," etc., attributed to Thomas Brown (q.v.). He died July 10, 1686.

**Fellah** (plur. Fellahin). Arabic word for peasant or ploughman, especially in Egypt. Forming the bulk of the native population, the fellahin descend in direct lineage from the ancient Egyptians. They dwell in villages, mainly of mud hovels, under a village chief, the sheikh-el-beled. A wooden statuette, now at Cairo,

of a IVth-dynasty official, found by Mariette at Sakkara, was given that title by the workmen from its likeness to their own headman. (See *illus.* p. 2825.) Some are Christian Copts, 9,000,000 are Moslems.

Of medium height, black-eyed, thick-lipped, and straight-nosed, the Semitic and Nubian elements they have absorbed have but slightly affected their racial make-up as a Caucasian people of the Mediterranean type. The progressive deepening of hue from N. to S. marks the influence both of climate



**Felixstowe.** The promenade, looking towards the pier from the Cliff Gardens

Frith

and of ethnic contact. The women, who wear head-veils, which expose the antimony-stained eyelashes and tattooed chin, are sometimes wed by the nomad Beduins, but the amount of racial mixture in actual progress is inconsiderable.

Their food is largely vegetable, and they are mostly abstemious. Many of their methods of cereal and pulse cultivation, and of irrigation with water-wheel, sakiya, and balanced bucket, shaduf, are of remote antiquity. The water-carrier, sakka, is often a member



**Fellah.** Egyptian sakka or water-carrier

of a dervish sect, whose ritual demonstration, *zikir*, is the occasion of much festivity, wherein quarter-staff, *nabut*, is a favourite game. The veneration of trees and stones, and the universal employment of amulets, mark the persistence of the predynastic animism of the Nile valley. The sedentary peasantry of Palestine, also called *fellahin*, are largely descended from the primitive Canaanite stock. Except for a few colonies introduced under Mehemet Ali, they have no ethnic identity with their Egyptian namesakes.

**Felling.** Urban dist. of Durham, England. It is 1½ m. S.E. of Gateshead, of which it forms a suburb. It has a station on the N.E.R., also coal-mining, engineering, shipbuilding, and other industries. Pop. 25,026. See Gateshead.

**Fellmonger.** Dealer in the pelts of slaughtered sheep, one who separates the wool from the hides. The skins may be soaked in lime-water until the roots of the fibre are loosened sufficiently to come away with ease, a method which gives the so-called *sliped* wool. Alternatively the skins may be hung in moist air until bacterial action has loosened the fleece, and this is the method adopted in Mazamet, France, the chief centre of *fellmongering*. Chemical means may be substituted, the flesh side of the hide being painted overnight with a solution of sodium sulphide. See Leather.

**Fellow.** Word meaning a male person. It is now used in two senses. In general speech, usually in a slighting sense, it means a man, and academically it refers to certain members of colleges at Oxford, Cambridge, or elsewhere, and to members of learned societies. The original meaning was that of a companion, hence the phrase *fellow-countryman*, and this survives in its use at the universities, where it is the equivalent of the Latin *socius*.

In the colleges of Oxford and Cambridge, a fellow is a member of the governing body and foundation, and a fellowship is a coveted distinction only bestowed on scholars of exceptional ability. Before the reforms of 1877-81 fellows were usually chosen for life, or until marriage. To-day the fellows are chosen by the existing fellows, usually for a definite term of years. They may be elected on a reputation or after examination, or because suitable for a particular vacancy on the teaching or managing staff. Many of them act as tutors, and form the group that with the head is responsible for the daily work of the college.

The fellows of Eton and Winchester form the governing body. The fellows of Trinity College, Dublin, who are divided into senior and junior fellows, are elected after examination, and hold the position for life. King's College, London, and some other colleges, have fellows, but their duties are rather different from those at the older universities. Following this use, fellow is used for member of a learned society. See University.

**Felo de se** (late Lat. *felo*, evil doer, i.e. slayer; *de se*, of himself). English legal term, meaning a man who commits a "felony against himself"—in other words, a suicide. A suicide used to be buried, as Thomas Hood puts it, "at four cross roads, with a stake in his inside." This ended in 1824, and the body of a suicide was ordered to be buried in the usual burial-ground without divine service, between 9 p.m. and midnight. In 1882 the night burial was abolished and a religious service permitted; but the Burial Service of the Church is not allowed by the rubrics to be used. See Suicide.

**Felony.** Class of crime in English law. By common law all crimes are either felonies or misdemeanours. Nobody knows for certain the original distinction between them; one theory is that a felony was originally a crime involving a breach of the king's peace. Certainly until 1870 the lands and goods of a felon were forfeited to the crown.

Jurymen are sworn separately in a trial for felony, but together for misdemeanour. The accused is called the prisoner at the bar in felony, but the defendant in misdemeanour. To be convicted of felony after a previous conviction for felony is itself a felony. To conceal a felony is a crime—misprision of felony. A prisoner convicted of felony must be "called upon"—that is, asked if he has anything to say before sentence is passed.

**Felsite.** Close-grained or compact rock of varying colour. It consists of altered lava which has lost its glassy structure. Small crystals of feldspar and quartz are scattered through the ground-mass of the rock. See Rhyolite.

**Feldspar.** Important group of rock-forming minerals, variable in chemical composition, crystalline form, and colour. Chemically they



**Feldspar.** Huge masses of orthoclase, weighing many tons, at Carne, near Veryan, Cornwall

are silicates of alumina with variable proportions of potassium, sodium, or calcium; hence sometimes distinguished as potash-feldspar, soda-feldspar, lime-feldspar. Widely distributed, they are usually opaque and dull of colour. A few varieties are handsome, and are cut as gem stones. Amazon stone is a potash feldspar of a verdigris green colour with bluish tinge, found in N. America and the Urals. Sunstone is a semi-translucent, almost white material, showing by reflected light a brilliant red metallic glitter, and is obtained in Siberia, Norway, and N. America. Moonstone is a translucent white feldspar emitting by reflected light a milky, bluish gleam. In crystalline form feldspars are either monoclinic or triclinic.

Monoclinic species are orthoclase (potash-feldspar) and its glass-clear variety sanidine. Other varieties are adularia (colourless), moonstone, sunstone (aventurine). Triclinic species include microcline (a potash-feldspar), anorthoclase (soda-potash feldspar), and the plagioclase feldspars. See illus. p. 2389.

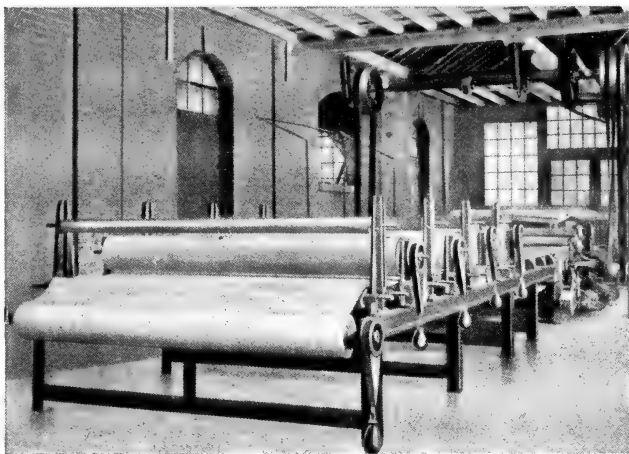
**Felsted School.** English public school. It was founded in 1564 by Richard, Lord Riche, and is now governed by a scheme dating from 1876. It consists of the school house, divided into four houses, another house, and a junior house, the accommodation being for about 300 boys. It stands in grounds of 42 acres, and there are scholarships to the school. The village of Felsted, sometimes called Felstead, is 3 m. S.E. of Dunmow and has a station on the G.E.R. Pop. 1,969.

**Felt** (A.S.). Cloth made of wool, hair or fur, or mixtures, compacted by moistening, heating, rolling, and pressing. Some felts are woven, but the true felts are unwoven. Wool possesses the highest felting properties, and the fur or hair of the ox, goat, hare, rabbit, and beaver are readily felted.

The principal hat felts are made of rabbit ("coney" in the trade), hare, beaver, musquash, and

nutria; cow hair is used largely for roofing felts. Felting is probably older than weaving, the cloth having been used for tents, clothing, and other purposes from the remotest times. The invention is sometimes ascribed to Oriental shepherds, and stories are extant of kings, monks, and others putting wool into their shoes or sandals and finding it turned by walking into a new fabric. Clement of Rome was commemorated by hatters as the inventor of felt. *See* Hat.

**Feltham.** Urb. dist. and village of Middlesex, England. It is 16 m. W.S.W. of London, on the L. & S.W.R. The London County Council has an industrial school for boys here, and there are large nurseries and market gardens in the neighbourhood. Extensive aeroplane-building works were established here by the Whitehead Aircraft Co. during the Great War. Pop. 5,135.



Felt. Table or plate machine for felting four pieces at one time

By courtesy of W. Bywater Ltd., Leeds



Feltham, Middlesex. The High Street looking towards the church of St. Catherine

**Feltmakers' Company,** THE. London city livery company. Incorporated 1604 and an offshoot of the Haberdashers, it was founded to regulate the making and sale of felt hats. Feltmakers were formerly known as felt-mongers, and as such existed in the 12th century. The offices are at Arundel House, W.C.

**Felton, JOHN** (c. 1595-1628). English soldier. He came of a good early entered the



Feltmakers' Company arms



John Felton, English soldier

From an old engraving

and his animosity against Buckingham, increased by brooding over the attacks on the favourite, turned his thoughts to assassination, and he mortally stabbed the duke at Portsmouth, Aug. 23, 1628. He was hanged at Tyburn, Nov. 28.

**Feltre** (anc. *Feltria*). City of Italy, in the prov. of Belluno. A picturesque place, standing on an eminence near the Piave river, it is 34 m. by rly. N.W. of Treviso. It has a ruined castle, a cathedral, a modern palace, and a municipal pawnshop, said to be the oldest establishment of the kind in Europe. Minor buildings include a hospital, gymnasium, seminary, and an asylum for orphans. In 1819 the bishopric was incorporated with that of Belluno. There is trade in wine, oil, and silk. Pop. 15,465.

**Felucca** (Arab. *falūka*, Ital. *feluca*). Vessel used in the Levant and on the Nile. It is propelled by lateen sails and oars, and moves swiftly. Sometimes the helm can be used at either end of the hull.

**Feluja.** Town of Mesopotamia. Situated on the Lower Euphrates, it is about 40 m. W. of Bagdad, with which it is connected by a rly. built by the British during the Great War after the capture of that city. It was occupied by the British on March 19, 1917.

**Felup** OR **FULUP**. Collective name applied by Portuguese traders to numerous primitive negro tribes in the coast-lands of French

Senegal and Portuguese Guinea. Under the Mandingan name Jola they extend into British Gambia. Their allied semi-Bantu dialects prevail from the Gambia and Casamance to the Cacheo and Geba rivers. The typical Felup are muscular, flat-nosed, thick-lipped, dark-bronze-coloured hunters, almost unclad, using bow and arrow and inhabiting roughly constructed log-huts or earth-houses.

**Feme** OR **FEMME**. Anglo-Norman legal term for a woman. A woman who is married is called *feme couverte*, and a woman who is either a spinster, a widow, or divorced, is *feme sole*.

**Feminism** (Lat. *femina*, a woman). Term which may be taken to embrace the movement for the raising of the economic, legal, and political status of women. In the decade before the Great War the attention of feminists in most European countries was necessarily concentrated on the acquisition of the right to vote, and now that



Felucca. Egyptian sailing boat on the Nile above Cairo

political power has been won in the Anglo-Saxon, Teuton, and Slav nations, women are considering how that power shall be used to secure the necessary legal and social reforms. The status and the ambitions of women differ widely even in advanced and modern civilized countries, but the stages of the feminist movement in each racial group are fairly well defined.

Scandinavian women have long had equal educational advantages with men; they early acquired political power, and are determined to secure absolute equality in professional and industrial life, and independence, as nearly as may be, in marriage and family life. There is no suggestion that a woman should abandon her profession when she marries, and so place herself in dependence on her husband.

In Great Britain feminist ideals tend more and more towards the Scandinavian, but with a difference due probably to temperament and education. The English feminist claims equal pay for equal work, an adjustment of the marriage laws, equal partnership and give and take between the sexes, but she clearly wishes to develop on her own lines, not on masculine lines. She is inclined to think that the Scandinavian development takes too little account of sex. Olive Schreiner's work, too little acknowledged, has had great influence on English women in this connexion.

The German feminist moves rather slowly in the direction of her Scandinavian sisters, but in Czecho-Slovakia women have leapt at one stride into full political activity. In the Latin countries the ideal of domestic and social life is, and always has been, very different, and this is no doubt the reason why the demand for suffrage has not been insistent. The Frenchwoman still, in the main, exercises her power indirectly. It is remarkable that in France, where the authority of the mother, and even of the grandmother, is very great in the family, and where women of the lower middle class are conspicuous for successful and often equal share in their husband's business, women should so long have submitted to the injustice of the Code Napoléon, which leaves them legally in the position of minors, and with virtually no personal liberty before the law. But even in France, and more slowly in the two other great Catholic countries of Europe, Italy and Spain, women are beginning to demand greater independence and a voice in public affairs.

The social and political unrest in the Middle and Far East is having

its repercussion on women. In Islam, women are beginning to resent their immemorial position of servitude; they are demanding education and the right to come into the open. In non-Mahomedan India, women are demanding and receiving a better education and a better industrial position. They also look for a change in the marriage law. Similar movements are taking place all over the East.

American women, like their European sisters, have received the vote. Feminist propaganda has in some ways a less favourable soil to work on. There is to a great extent co-education, there is less pressure on women to earn their own living, and divorce is less difficult than in Europe. And because of these conditions there is less incentive to violent discontent. It remains to be seen on what characteristic lines American feminists will move.

Margaret Bryant

**Femmes Savantes, LES** (The Learned Women). Five-act comedy by Molière, first acted at the Palais-Royal, Paris, March 11, 1672. In it Molière returns to the theme of feminine affectation less seriously treated in his *Les Précieuses Ridicules*. The easy-going bourgeois Chrysale is at the mercy of a wife and one of his two daughters. The wife has more pretence to learning than knowledge or intelligence, and the elder daughter, Armande, is like her mother, who is abetted by an old maid, Chrysale's sister. Clitandre, suitor to Armande, is rebuffed, and turns to her more simple-minded sister Henriette, whom the mother wishes to marry the parlour-poet Trissotin. The *dénouement*, in which Henriette and Clitandre are united, is brought about by Chrysale's brother Ariste, who exposes the mercenary character of Trissotin. Molière acted the part of Chrysale. Trissotin is usually accepted as a caricature of the Abbé Cotin, the feeble pettiness and pretentiousness of whose verses Molière regarded as fair game for satire.

**Femoral Artery** (Lat. *femur*, thigh). Main artery of the thigh running from the groin to a point rather above the knee, where it becomes the popliteal artery and is continued down the leg. It gives off numerous branches, which supply the muscles and skin with blood.

**Femur** or **THIGH-BONE**. Longest bone in the human body. Above it articulates with the pelvis to form the hip-joint, and below with the patella (knee-cap) and tibia to form the knee-joint. The superior extremity consists of a rounded eminence, the head, which fits into the *acetabulum* or socket of the

pelvis, the neck, which is set at about an angle of 125° with the shaft of the bone, and two bony prominences known as the greater and lesser *trochanters*, which serve for the attachments of muscles. The shaft of the femur is somewhat convex forwards, and in the central third of the posterior surface bears a prominent ridge, the *linea aspera*, to which muscles are attached. The inferior extremity broadens out into two expansions, the internal and external tuberosities, which terminate in two smooth rounded articular eminences known as the condyles, separated from each other by a deep depression, the inter-condylar notch.

Fracture of the shaft of the femur is a common accident. If due to indirect violence the fracture is usually oblique, if due to direct violence more or less transverse. Unless complicated by serious damage to the soft parts, the fracture usually unites in from 6 to 8 weeks, though the leg should not be made to bear the full weight of the body for another two months. Fracture of the neck of the femur is most often met with in elderly persons, whose bones have become weakened by atrophy. The condition is always serious in aged persons, owing to the difficulty of getting the broken fragments to unite, and to the risk of pneumonia supervening, which is always present when it is necessary to keep an elderly patient in bed for any considerable length of time. See Hip-joint; Knee-joint.

**Fen.** Anglo-Saxon word for marshy or boggy land. The district of this nature in Cambridgeshire, Norfolk, Huntingdonshire, and Lincolnshire is known as the Fens. The will o' the wisp is sometimes called the fenfire, while fenberry is another name for the cranberry. See Fens.

**Fence.** Device used on farms for boundary purposes, to prevent stock from wandering and as a wind-screen. The proper establishment and maintenance of fences is costly; they often waste valuable ground, and neglected hedges in particular harbour vermin and weeds, the latter often serving to maintain insect and fungoid pests.

Turf fences, chiefly consisting of mud and stones, are cheap and fairly durable if properly drained and protected from the rain by coping-stones. Walls, usually of the dry sort, without cement or mortar, are much favoured where suitable flat stones are available. They last for many years if carefully built, but after 50 years or more they are liable to get out of plumb, and fall after winter frosts.

Wood and wire fences include a large number of contrivances. These may consist entirely of wood (palings, stakes, and brushwood, post and rail), wood and wire, or wire with iron or concrete standards. Wood lasts much longer if treated with creosote or stop-rot composition, or simply tarred. That part of a post driven into the ground should previously be tarred. A farmer can only employ barbed wire lawfully if it falls entirely within the boundaries of his own holding; if used in a fence adjoining another farm, or adjacent to a public road, he will be liable for any injury it may cause to human beings or other people's stock. One useful kind of wire is rabbit-proof netting, for keeping out hares and rabbits. Hedges are particularly characteristic of many parts of England, and when well established present many advantages. They are costly, however, and require continual care.

Hedging is an expert rural art, and involves not merely lopping of superfluous twigs and branches, but also "laying" at least every 20 years. In this process the main stems are partly cut through not far from the bottom, bent into an oblique or horizontal position, and then secured. This promotes the growth of shoots at the base of the hedge, without which it will never form a thick continuous stock-proof barrier. Equally important is the provision of a ditch adequately drained, and its maintenance in a clean condition free from weeds and rubbish. The best hedge-plant is the hawthorn (quick), while beech and hornbeam also give good results. Mixed hedges are not to be recommended. *See Hedge.*

**Fenchurch Street.** London thoroughfare. The name is believed to have been derived from the fenny ground in the vicinity when the Langbourne was a running brook. The street runs E. from Gracechurch Street, describing a northward curve until it meets Leadenhall Street at Aldgate Pump. At the London Tavern, rebuilt in 1877, Queen Elizabeth is supposed to have dined in 1554. Ironmongers' Hall is in this street. Mark Lane, a turning on the S. side, is known for its Old and New Corn Exchanges. Lloyd's Avenue was made in 1899.

**Fencible.** Term applied to regiments of horse and foot raised for limited service within the kingdom and for a limited time. They ranked junior to the standing army. The new armies raised in 1915 would have been called fencibles in 18th century England. The word meant anything capable of defence.

## FENCING: ENGLISH AND CONTINENTAL

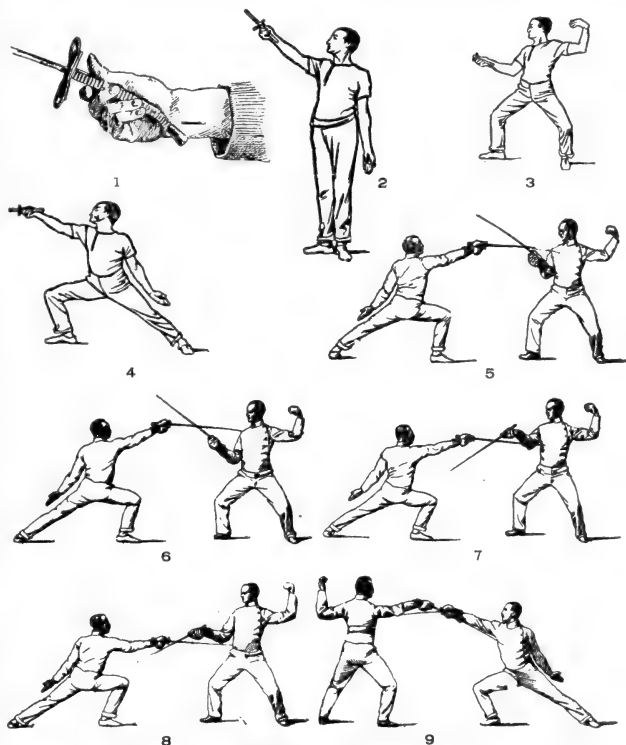
Sir T. A. Cook, Captain, English Fencing Team, 1903 and 1906

*The art of using various light weapons is here outlined. Allied information will be found in the articles Rapier; Sabre; Sword, etc.*

Fencing is the art of using as a recreation the épée, foil, sabre, or other light weapon. In England it may be said to have come in about the time of Elizabeth, when the superiority of the rapier and the point over the edge and broadsword was realized. But the introduction of pistols in duelling, the disuse of the sword as a customary accompaniment to every gentleman's attire, and the national preference for boxing combined to drive the practical Englishman from fencing lessons, which retained a merely academic interest. It was only about 1905 that the badge of the English fencing team (a Tudor rose) recalled for the first time for nearly three centuries the official patronage extended to masters of arms by Henry VIII. Even this would not have been accomplished had the revival of English fencing depended solely on the scholastic graces of conventional foil-play. To the *épée de combat*, the modern French duelling sword, but with a

button on its point, we owe the rapid development of fencing in the 20th century.

Moreover, the conventions of foil-play had overgrown its beauty, and the extreme difficulty of scoring, if scoring be indeed advisable at all, added yet another reason against its general popularity. The average young Englishman at the dawn of the 20th century liked to know whether he was really better or worse than his opponent, and objected to being told he could score nothing when his weapon, had it been sharp, would obviously have slain or seriously disabled his adversary. When he was given a game which enabled him to hit his man anywhere from the top of his head to the sole of his feet, and necessitated the guarding of an equal area in his own person, the combination of possibilities became interesting. When he realized that his old lessons with the foil were just as essential as before, by way of a correct foundation for sound



Fencing. 1. Position of hand on foil. 2. Preliminary position. 3. On guard. 4. Lunge. 5. Parry of octave. 6. Parry of sixte. 7. Parry of septime. 8. Parry of octave. 9. Riposte from parry of quarte.



sword-play, but were now the introduction to far wider and more thrilling practical problems, he began to see that fencing was one of the best games in the world. By swift degrees he took up the science and art of the *épée* until he could at least make a fair fight with the best exponents of the sword in Europe.

In 1900 Sulzbacher fought in the first pool ever seen by an English audience. In 1903 the first fencing team to represent Great Britain was sent out to Paris by the amateur fencing association to compete in the *grande semaine* for the international medals. It was beaten by France; but it won the second place by conquering Belgium, who had her revenge in 1912 at Stockholm, where France was not represented. In 1906 at the Olympic Games at Athens a British team for the first time fought France to a dead heat in the final of an international tournament, and a Britisher hit four Frenchmen one after another. In the Olympic Games at Antwerp in 1920 the challenge cup, presented by British fencers for amateur *épée* teams, open to the world, was won by the Italians, chiefly owing to the fine fencing of the brothers Nadi, who also put their country ahead in foils and sabres. The English team, though well up to the average, did not do as well as usual in any of the three weapons at these games, one reason being a new rule which gave points in foil-play to hits on the sword-arm from the shoulder to the elbow.

To obtain practice fencers often form a pool. The winner is he who is least hit. The score-sheet would be something of this kind:

	A	B	C	D	E	F	Hits received
A		0	1	0	1	1	3
B	1		0	0	1	0	2
C	0	1		1	1d	0	3
D	1	1	0		0	1d	3
E	0	0	1d	1		1	3
F	0	1	1	1d	0		3

This would show that B wins because he received less hits than anyone else, having lost only to A and to E. Turning to A's line, under the column marked B one finds a cipher showing that he won his fight against B, and another cipher appears in E's line, also under the column marked B. It will be noticed also that C, D, E, and F have each one square with the mark 1d; this means a *coup double*, to signify that a hit was scored against each man, probably because one of them, when

attacked, defended himself by a counter-attack instead of a parry, and though he hit his man he was not quick enough to do so before being hit himself. Though this is sometimes a calculated stroke on the part of a fencer admittedly inferior to his opponent, it is not generally considered good fencing.

A pretty variation of the pool, when there are eight fencers or more, is the team fight. The number of fights in a pool can be easily calculated. Let X be the total fencers; the number of fights will be  $X(X-1)/2$ . Therefore if the pool is composed of six fencers there will be  $(6(6-1))/2=15$ .

#### Style in Fencing

To turn to style. In fencing it is possible to analyse all the useful movements mathematically into conic sections, the point of the sword describing the base of the cone of which the apex is the pommel. Again, they may be described geometrically by assuming the position of the point in the final thrust to be within one or other of the quadrants of the circle on a compass, i.e. between the cardinal points N. and E. or N. and W. in the upper lines, and the cardinal points S. and E. or S. and W. in the lower lines. Practically this exhausts the possibilities of the *fleuret*. It also serves as a definition for any thrust or parry with the sword; for wherever an attacking blade threatens a thrust, thither should the defending sword immediately follow it, and though the central point of the circle on the compass may shift from breast to throat, or breast to knee, the relative movements of the subsequent final attack or defence will remain the same. To make any movement outside the imaginary circle, with a radius of about fifteen inches at most, would obviously be dangerous.

The easy way in which diagrams and mathematics can be applied to perfect swordsmanship was the pitfall in the progress of the art of fencing with the point. It resulted in vast and complicated encyclopedias which were of little practical use, if any, in a real fight. The *riposte*, perhaps the most deadly stroke of all, was only "invented" after duelling had been largely discontinued; and the basic principle of all first-rate exercise in the early days of fencing was entirely lost sight of; indeed, it has only emerged into general view in the last generation. The principle may be briefly stated as the employment, in any sudden action, which may in this case involve life or death, of the simplest, most direct, and most instinctive movement—instinctive in the special

sense of the result of putting into unconscious practice a series of simple and perfectly executed movements originally learnt with more or less difficulty.

In the thrust the knuckles must be turned toward the ground if the point is to be straight, the head must be erect, the point of the toe in a direct line with the point of the sword, the shoulders at once loose and low, the left foot exactly at right angles to the right. Unless these things at least have become instinctive (in the sense defined), it is useless to try fencing either with foil or sword even in any friendly competition. But these things being granted, an illimitable field for activity, for delicate speed, for subtle character, for courage, for patience, opens up before the courteous swordsman. No game in the world enables you so quickly to take the measure of your man. The sword becomes a nerve stretching from your heart right down to the searching, pulsating point in front of you. It feels the opposing blade. At last it seems as if you might fence blindfold, so extraordinarily is that sixth sense developed which deals with "time, distance, and proportion," as you fight. The parry that fails to find your adversary's sword automatically repeats itself. The thrust that meets his guarding blade slips almost unconsciously the other side of it.

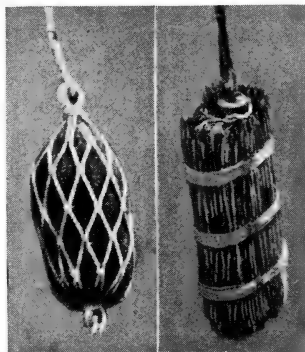
#### French and Italian Schools

It is held that the French school of foil and *épée*-play is invariably the best, in spite of occasional brilliant exceptions like the brothers Nadi at Antwerp in 1920, while the Italian school of sabre leads the world in that deadly and beautiful weapon, the *sciabola*. This is as light as an *épée de combat* and almost as deadly with its point, while the swift play of its edge adds great variety and excellence to any contest. It is the combination of edge with point which is the supreme beauty of this weapon, and those who know only either single-stick or heavy sabre could never appreciate the subtle, swift, and delicate play required of the first-rate swordsman in the Italian school of sabre.

**Bibliography.** A Bibliography of Fencing and Duelling, C. A. T. Thimm, 1896; L'Escrime, J. Joseph Renaud, 1911; The Sword and the Centuries, Alfred Hutton, 1901; Secrets of the Sword, Barancourt, Eng. trans. C. Felix Clay, 1900; The Works of George Silver, 1599, ed. Cyril Matthey, 1898; Schools and Masters of Fence, Egerton Castle, 1892; Cold Steel, Alfred Hutton, 1889; Fencing (with Boxing and Wrestling), W. H. Pollock, in The Badminton Library, 1889.

**Fender.** Article of domestic furniture. It is used as a guard against the falling of hot cinders from the fire into the room. It is generally made of a flat oblong of japanned metal, with a raised edge of brass or steel along the outer side and the two ends. Its use followed upon the introduction of grates raised from the floor, and it superseded the old shallow kerb which enclosed the open stone hearth.

**Fender.** Nautical term for a bundle of sticks, rope or wood dropped over a vessel's side to prevent her from rubbing against another vessel or the wall of a quay. Hence the expression to fend off, i.e. to keep away, to protect. A "pudding fender" is a large ball of old rope used as a fender.

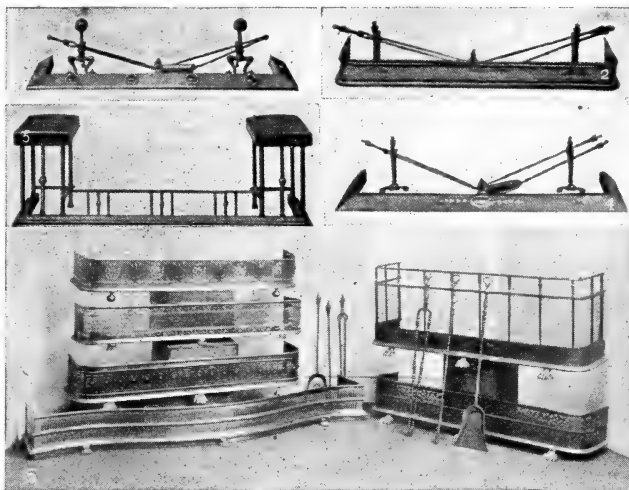


**Fender.** Left, rope fender in net; right, fender of hazel wood bound with wire

*Cribb, Southsea*

**Fénelon, FRANÇOIS DE SALIGNAC DE LA MOTHE** (1651-1715). French ecclesiastic, author and academician. He was born near Sarlat, Aug. 6, 1651. Ordained priest in 1675, he was director of the convent of the Nouvelles Catholiques, and missionary to the Protestants in the disturbed provinces of Poitou and Saintonges, the fascination of his personality being a great factor in his success. In 1689 he was appointed preceptor to Louis XIV's grandson, the duke of Burgundy, and in 1695 was made archbishop of Cambrai. Soon after this his interest in Quietism and defence of its leader, Mme. Guyon, brought him into collision with his old friend Bossuet, who, after a bitter controversy, obtained the condemnation by Rome (1699) of his offending volume *Explication des Maximes des Saints sur la Vie Intérieure*. He died Jan. 7, 1715.

Fénelon was a man of great versatility and his writings cover a wide range. The best known is the didactic romance, *Les Aventures de Télémaque*, 1699, which, like his *Fables* and his *Dialogues des Morts*,



**Fender.** Examples in domestic use. 1 to 4, the modern kerb form: 1, of cast steel; 2, of polished brass, pierced and beaded; 3, brass, fitted with seats; 4, copper, antique style. 5, Steel and brass fenders of the 18th century

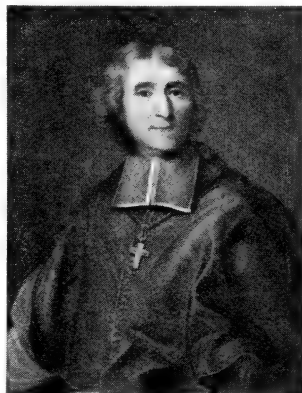
1-4, by courtesy of Waring & Gillow, Ltd.; 5, of Gill & Reigate, Ltd.

was designed to instruct his royal pupil in the conduct of life and the responsibilities of absolute government. His *Éducation des Filles*, 1687, has also a place in the pedagogical literature of the time. See *Lives*, Viscount Saint-Cyres, 1901; and P. E. R. Janet, Eng. trans. V. Leuliette, 1914.

**Feng-huang-cheng.** Town of Manchuria, China, in the prov. of Fengtien, on the Mukden-Antung Rly. It was opened to international trade by agreement between China and Japan, 1905. Pop. 25,000.

**Feng-siang.** Town of China, in the prov. of Shensi. It is perched on a high loess terrace on the main road from Peking to Lanchow.

**Fengtien** OR SHENG-KING. Dependency of the Chinese Republic.



*François de Fénelon*  
After Vivien, Louvre, Paris

It is the most southerly of the three provs. of Manchuria, lying between Pe-chili on the W. and Korea on the E. In the S. the Liau-tung Peninsula projects between the Gulf of Liau-tung and Korea Bay. At its S. extremity is Port Arthur, leased to Japan for 99 years from 1915. The capital is Mukden, other towns of importance being Fu - chau, Kinchau, and Newchwang. Area, 56,000 sq. m. Pop. 10,312,241.

**Feng-yang.** City of China, in the prov. of Anhui (Nganhui). It was the birthplace of the Mings, but the first emperor transferred his capital to Nanking.

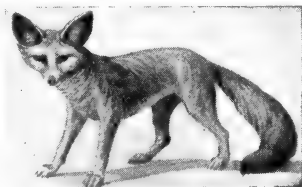
**Feng-ho.** River of China, in the prov. of Shansi. It is a tributary of the Yellow River.

**Fenianism.** Name given to the revolutionary movement springing from the Fenian brotherhood. Its real name was the Irish Revolutionary Brotherhood. One of the organizers, O'Mahoney, gave it the name of the Fenian Society, and by that name it became known.

The name was derived from the semi-legendary warrior bands (Fianna) of early Irish history. The society was really a political association of Irish and Irish-Americans whose object was to overthrow British government in Ireland and establish a republic there. There was an American branch and an Irish branch. It has been said that the movement began in America, but really the plans for both branches were drawn up in Paris by a small band of Irish revolutionaries in 1848.

The Irish famines in the 'forties caused a great emigration to America, and the emigrants laid the blame for their exile on the British Government, which had been painfully unsuccessful in its efforts to cope with distress. The sentiment of hatred towards England was fomented by James Stephens and others, who had escaped after the abortive Young Ireland insurrection of 1848. The organizers knew that open rebellion against the armed forces of the British Government could bring only disaster, but were persuaded that justice could not be won by peaceful methods. Therefore they held it justifiable to foster "secret warfare"—which those who did not sympathise with them called outrage and assassination. Their aim was purely political; being neither religious nor agrarian, it appealed neither to the priesthood nor to the peasantry.

James Stephens returned to Ireland to organize the society in that country, while the real headquarters remained in America. In the American Civil War, which ended in 1865, large numbers of American Irish had learnt the business of fighting. The moment seemed ripe for the organization of risings, and an active secret propaganda was set to work in Ireland; but the authorities were on the alert, seized the offices of the Fenian organ, "The Irish People," and arrested sundry ringleaders. For the time the vigilance of the government seemed to have para-



Fennec. Small fox found in the deserts of North Africa

lysed the conspirators. In 1866 some hundreds of American Irish attempted to raise an insurrection in Canada, but failed completely, receiving none of the support expected from the U.S.A. government. Another effort, however, had been prepared in England and Ireland. In Feb. 1867 a plan to seize the arsenal in Chester Castle was forestalled by drafting troops to that city.

In Sept., two Fenians were arrested in Manchester on charges of felony. A rescue was attempted, the prisoners escaped, and a police officer was killed, but 29 Fenians were arrested and three were hanged for the murder of the sergeant, which had not been inten-

ded, and of which the men convicted had been guilty only in a technical sense. These men became known as the Manchester Martyrs. A worse crime was the blowing up of a part of Clerkenwell prison on December 13. The brotherhood after this time became merged in other societies of a similar character, such as Clan-na-Gael (*q.v.*), and the Irish Republican Brotherhood. See Ireland; History; Parnell.

**Fenn, GEORGE MANVILLE** (1831-1909). British novelist and story-writer for boys. He was born at Westminster and was educated at private schools. Having early contributed to popular periodicals, he was in 1870 appointed editor of Cassell's Magazine, and in 1873 became proprietor of *Once a Week*. His published work totalled close upon 200 volumes and included numerous stories told in pleasant narrative style, among them being *The Sapphire Cross*, 1871; *The Parson o' Dumford*, 1879; *Off to the Wilds*, 1881; *Nat the Naturalist*, 1883; *Bunyip Land*, 1885; *The Bag of Diamonds*, 1887; *A Crimson Crime*, 1899.



G. Manville Fenn,  
British novelist  
*Elliott & Fry*

**Fennec** (*Canis zerda*). Small fox-like member of the dog family, found in N. Africa. The ears are enormously long, sometimes a quarter the length of the whole body. The colour is a very pale buff, with white beneath and a black tip to the tail. It lives in burrows in the desert and feeds at night on birds, lizards and small mammals.

**Fennel** (*Foeniculum vulgare*). Tall perennial herb of the natural order Umbelliferae. It is a native of Europe, N. Africa, and W. Asia. The leaves are much divided into thread-like segments. The tubular, but almost solid stem is 3 ft.-4 ft. in height, crowned with compound umbels of minute yellow flowers. The fruits are compressed from side to side. The leaves are used as a pot-herb, and for garnishing dishes, and the fruit supplies an aromatic oil which possesses carminative properties.

**Fenny Stratford**. Market town and urban district of Buckinghamshire, England. It stands on the Ouzel, 48 m. N.W. of London and 17 m. S.W. of Bedford, and has a station on the L. & N.W. Rly. It has a trade in agricultural produce. The chief building is S. Martin's church, dating from the 18th cen-

tury. Market day, Thurs. (alternate). Pop. 4,000.

**Fens**. Extensive flat and low-lying region of England, 70 m. in length and 35 m. in extreme breadth, occupying parts of several counties in the neighbourhood of the Wash. They represent the silted up portion of a bay of which only the Wash is left, and systematic drainage at various periods has rendered them extremely fertile. The Romans attempted to drain the Fens by constructing causeways and throwing up immense embankments along the rivers and the seashore, but the sluices were gradually choked and the district again became waterlogged, serious inundations by the sea occurring at intervals down to the second half of the 16th century.

In 1634, Francis, earl of Bedford, and thirteen co-adventurers undertook to drain the area now known as the Bedford Level (*q.v.*). It was not until 1807, however, that the effectual draining of the entire region was finally accomplished, the Holland and neighbouring fens having been reclaimed in 1767, the Witham Fens in 1807, and the Welland Fens almost totally reclaimed by 1801. Grain, flax, cole-seed and potatoes are extensively cultivated, and wild-fowl abound. The Fen country is the home of English skating.



Fennel. Flower-head and leaf of *Foeniculum vulgare*

During the second half of the 7th century, Peterborough, Ely, Ramsey, Thorney, Crowland and many other places were settled by members of various monastic orders, who erected churches, monasteries and abbeys.

**Fenton** OR GREAT FENTON. Parish of Staffordshire, England, now part of the county borough of Stoke-on-Trent. It has a station on the N. Staffs Rly., and is largely engaged in earthenware manufacture. To the east of Stoke, it was a separate urban district until absorbed. Market day, Sat. Pop. 25,626. See Stoke-upon-Trent.

**Fenton, LAVINIA** (1708-60). English actress. She made her first appearance in 1726 as Monimia in Otway's *The Orphan*. Her beauty, voice, and charm soon made her a reigning toast, and her success as Polly Peachum in Gay's *Beggar's Opera* (Jan. 29, 1728) at Lincoln's Inn Fields was such that the opera was played 62 times during the season, and in it the actress made her last appearance on the boards. The 3rd duke of Bolton married her in 1751. She died on Jan. 24, 1760.

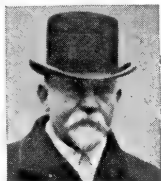


Lavinia Fenton,  
English actress  
After Hogarth

**Fents** (Fr. *fente*, slit). Remnants of cloth from one yard to a few yards in length. They are too short for sale in a regular way, and are generally sold by weight.

**Fenugreek** (*Trigonella foenum Graecum*). Annual herb of the natural order Leguminosae. It is a native of S. Europe. The leaves are divided into toothed oval leaflets, flowers pea-like, white, on unbranched stems 1 ft. to 2 ft. high. The plant, whose name means Greek hay, has the odour of new-mown hay, into which it was made by the ancients. The seeds are used in veterinary medicine.

**Fenwick, CHARLES** (1850-1918). British politician. Born at Craxington, Northumberland, May 5, 1850, he worked on the pit-bank at the age of nine, and on his tenth birthday became an underground labourer. He was employed as a miner until 1885.



Charles Fenwick,  
British politician  
Barratt

Having educated himself in his spare time, he held offices under the Northumberland miners' association. He was elected to Parliament as Liberal-Labour candidate for the Wansbeck division in 1885. He was the first Labour M.P. to preside over the House of Commons in committee. He was secretary of the parliamentary committee of the Trade Union Congress, 1890-94, and was made a privy councillor in 1911. He represented the Wansbeck division until his death on April 22, 1918.

**Fenwick, SIR JOHN** (c. 1645-97). English conspirator. Of an old Northumberland family, he early

entered the army. Becoming major-general in 1688, he sat in Parliament for his native county, Northumberland, from 1677-85. Against William III Fenwick is said to have had an old personal grudge, perhaps reciprocated, and in 1696 he was arrested in connexion with an assassination plot. In his confession he cast aspersions on many prominent Whigs. He was attainted and beheaded on Tower Hill, Jan. 28, 1697.

**Feodor** (1557-98). Tsar of Russia. The son of Ivan the Terrible, he was born May 11, 1557, and came to the throne in 1584. Mentally deficient, he was never capable of ruling, and was under



Fenugreek. 1. Flower. 2. The entire plant. 3. Flower and leaf

the direct influence of his brother-in-law, Boris Godunov, who, upon Feodor's death, Jan. 7, 1598, ascended the throne.

**Feoffment.** In England, the Common Law method of transferring a fee, or freehold. It was a symbolical placing of the transferee in possession of the estate by delivering it to him. If it were a house, the transferor might hand him the key of the front door. If it were land he would hand him, on the land itself, a sod, or a twig, saying, "I liver this to thee in the name of seisin of Whitacre, which is bounded by" (here he would name the boundaries of the estate), "to have and to hold to thee and thy heirs," or for life, or as the case might be.

After a while it became customary to set out the boundaries, etc., in a deed on parchment, sealed with the seal of the parties, and then the feoffment was somewhat in this form, "I liver this (sod, twig, etc.) to thee in the name of all the lands set out in this my



Sir John Fenwick,  
English conspirator  
From an engraving

deed," at the same time handing over the deed. The deed was called a charter of feoffment. The Statute of Frauds (Charles II) made some writing necessary on the sale of land; but livery of seisin or feoffment was still necessary as well. To evade the necessity for feoffment the device was introduced of employing two deeds, (1) a lease to the transferee, and (2) a release to him of the reversion. Neither lease nor release required feoffment. By the Real Property Act, 1845, conveyances of freeholds are made lawful by deed of grant, which is the method in force to-day.

**Ferdinand.** Masculine Christian name. It comes from Teutonic words meaning a life of daring. Popular in Germany, it never became so in England. It was carried, however, into Italy and Spain, where many kings and other rulers bore it. The Spanish form is Fernando or Hernando, and the Italian Ferdinando.

**Ferdinand I** (1503-64). German king and Roman emperor. Born March 10, 1503, he was the younger son of the archduke Philip and of Joanna of Castile. He was thus a Hapsburg, a grandson of the emperor Maximilian and a brother of Charles V. His early years



Ferdinand I,  
German king  
After Titian

were passed in Spain, but after Charles was chosen emperor in 1519 he was given extensive territories in Germany and helped his brother in the work of government. In 1521 he married Anna, daughter of the king of Hungary and Bohemia, and when her childless brother Louis was killed in 1526 he put himself forward as his successor. In both lands he was chosen and crowned; in Bohemia he had some semblance of authority, but in Hungary he had for long little more than the name of king.

It is from Ferdinand, not from Charles, that the modern Hapsburgs are descended. The brothers agreed that on the elder's death Ferdinand should succeed him in Germany, leaving to Charles's son Philip only Spain and its colonies. Ferdinand, therefore, was chosen German king in 1531, and when Charles abdicated in 1559 the arrangement was carried out. In the intervening years Ferdinand was fighting for Hungary and dealing as best he could with the religious disorders in Germany and Bohemia. He was useful to Charles after the

latter's humiliation at the hands of Maurice of Saxony, and arranged with the Protestants the peace of Augsburg. His own reign as emperor (1558-64) saw but a continuance of his war with the Turks and of his efforts to settle the religious differences. He died in Vienna, July 25, 1564, his eldest son, Maximilian II, succeeding him.

**Ferdinand II** (1578-1637). German king and Roman emperor. Born at Gratz, July 9, 1578, he



**Ferdinand II,  
German king**  
*From an engraving*

was a son of the archduke Charles and a nephew of the emperor Maximilian II. Educated by the Jesuits, he began his public life as ruler of Styria and Carinthia, the portion of the Hapsburg domains that had been his father's share. His rule was chiefly distinguished for his persecution of the Protestants. In 1612 the emperor Rudolph, Ferdinand's cousin, died, and another cousin, Matthias, became emperor. He was old and childless, and the outcome of much political strategy was the decision that Ferdinand, and not one of his own brothers, should succeed him. The family agreed to the arrangement, and as a beginning the archduke was chosen king of Bohemia and king of Hungary. Matthias died in 1619 and in Aug. his nephew was elected German king.

Meanwhile, in 1618, the Thirty Years' War had begun. A rival to Ferdinand, set up by the Protestants in Bohemia, kindled the flame, and the struggle lasted throughout the emperor's lifetime. Ferdinand acted vigorously, and until the appearance of the Swedes, aided by Maximilian of Bavaria, he was completely victorious. He recovered Bohemia, put an end as far as possible to Protestantism, and by the edict of 1629 gave back lands taken from the Church. The Swedish intervention followed, and in 1635 the emperor made the treaty of Prague with some of his foes. He died Feb. 15, 1637, leaving by his wife, a Bavarian princess, two sons, his successor, Ferdinand III, and Leopold, a prelate. *See* Thirty Years' War.

**Ferdinand III** (1638-57). German king and Roman emperor. Son of the emperor Ferdinand II, he was born at Gratz, July 13, 1608. To secure his position his father had him crowned king of Hungary and king of Bohemia

during his own lifetime, and in 1636 he was chosen German king. In 1637 his father died and Ferdinand



**Ferdinand III,  
German king**

became the real ruler of these kingdoms and assumed the title of emperor. The Thirty Years' War, in which he had taken part, was then raging, and his reign saw its end in 1648. He died April 2, 1657. Ferdinand was succeeded by his eldest surviving son, Leopold I.

**Ferdinand** (b. 1861). Ex-tsar of Bulgaria. Born at Vienna, Feb. 26, 1861, he was the youngest

son of Augustus, prince of Saxe-Coburg-Gotha, and Clementine, daughter of Louis Philippe. He was well educated, and with his brother Augustus published a book on his botanical observations in Brazil. He entered the Austrian army, but soon his ambition led him in another direction. In 1887 Alexander, prince of Bulgaria, abdicated, and after much intrigue Ferdinand was chosen as his successor. Russia was opposed to him, but he won through and by 1896 most of the objections to him had ceased. In 1908 he proclaimed the independence of Bulgaria, and called himself king or tsar, winning recognition from the powers shortly afterwards. He was an advocate of the Balkan League, and was one of the instigators of the war of 1912-13.

On the outbreak of the Great War, Ferdinand was cautious enough to await developments before committing himself to any definite policy. His strong German tendencies gradually became more apparent, however, and finally, having exhausted all the prevarications of diplomacy, he declared war, Oct. 13, 1915. He played no conspicuous part in the war itself, and, on the final breakdown of the Bulgarian effort, he abdicated, Oct. 4, 1918, in favour of his son Boris, and retired to Germany. Ferdinand married first, in 1893, a Bourbon princess, daughter of the duke of Parma; and secondly, in 1908, Eleanor, a princess of Reuss.

**Ferdinand** (b. 1865). King of Rumania. Born at Sigmaringen,

Aug. 24, 1865, he was a son of Leopold, a member of the non-reigning and Roman Catholic branch of the Hohenzollern family.

In 1866 his uncle Charles had been chosen king of Rumania, and as his heir Ferdinand became king in Oct., 1914. The Great War was then in progress, but it was not until 1916 that Rumania joined in on the side of the Allies. The land was soon overrun by Austro-Germans, and during the difficult period that followed there were rumours of the king's abdication; but these did not materialize, and the end of the war saw him again in possession of his country. Ferdinand married in 1893 Marie, cousin of King George V.

**Ferdinand**. Name of several kings of Spain and Naples. Other than those who are given separate biographies, the principal are Ferdinand I (d. 1065), El Magno, or the Great, who became king of Castile in 1028; Ferdinand II (d. 1188), king of Leon; and Ferdinand IV (d. 1312), king of Castile. Of the Neapolitan kings, Ferdinand I (1423-84) was the natural son of Alphonso V of Aragon and I of Sicily. He succeeded to the throne by the will of his father. His reign was troubled by the jealousy of the other Italian states, wars with the Turks, and difficulties with France. His grandson, Ferdinand II (1469-96), was temporarily dispossessed by Charles VIII of France. The Bourbon Ferdinand III (1751-1825), king of Sicily, welded the titles of Naples into one and became Ferdinand I of the Two Sicilies.

**Ferdinand III** (1199-1252). King of Castile and Leon, called the Saint. Son of Alfonso IX of Leon and Berengaria of Castile, he succeeded his cousin Henry as king of Castile in 1217, and showed himself a prudent and merciful ruler. In 1231 the death of his father brought him the throne of Leon, and as king of Castile and Leon he waged war vigorously against the Moors, eventually confining them to Granada, and securing Seville in 1248. He was canonised by Clement X in 1671 on account of his unflinching orthodoxy in repressing the Albigenses, and for his services towards the Crusades.

**Ferdinand V** (1452-1516). King of Spain. Known as Ferdinand of Aragon, he was the son of John II, king of Aragon and Sicily, and was



**Ferdinand,  
King of Rumania**



**Ferdinand,  
Ex-tsar of Bulgaria**



born March 16, 1452. He was assigned the Sicilian kingdom in 1468, and succeeded his father as Ferdinand II of Aragon in 1479. In 1469 he had married Isabella, sister of Henry IV of Castile, the recognized heiress to the Castilian throne. Henry died in 1474, and Isabella was established as queen of Castile in 1479, the year in which Ferdinand succeeded to the crown of Aragon. There were now in the



**Ferdinand V,  
King of Spain**

*From a contempor. portrait*

Spanish peninsula five kingdoms: the Moorish dominion of Granada, Portugal, Navarre, Castile, and Aragon. The last two kingdoms were under one crown, though retaining separate governments. A long war with Granada ended triumphantly with its annexation in 1492; and in 1512 Ferdinand acquired almost all of Navarre.

Thus during his reign the entire peninsula, except Portugal, was brought under a single dominion. Sicily was already attached to the kingdom of Aragon, to which S. Italy or Naples was added by the ousting of the French in 1504. Further, the discovery of America, 1492, by Columbus, under the auspices of Ferdinand and Isabella, secured what was almost the monopoly of the New World to Spain, which had thus been raised to the position at least of equality with France. Isabella was something more than the partner of Ferdinand in the expansion of their joint dominion and in bringing each of their separate kingdoms under the effective control of the crown. She rendered ill service to Spain, however, by introducing the Inquisition (*q.v.*) in 1480. The expulsion of the Jews and the harsh restrictions imposed upon the Moors were also highly injurious. The course of future events was greatly influenced by the marriage of the elder daughter Joanna to Philip, duke of Burgundy, heir to the Austrian Hapsburgs, and of the younger, Catherine, first to Arthur, prince of Wales, and after his death to his brother Henry.

Ferdinand was noted as the craftiest sovereign of his day, his only rival in that quality being Henry VII of England, with whom he was usually joined in an alliance in which each sought the maximum advantage at the other's expense. After the death of Isabella, 1504, Ferdinand's craft degenerated

into mere cunning. The crowns of Castile and Aragon were actually parted when Isabella died; but Joanna, duchess of Burgundy, was heiress of both, and her place was taken by her son, afterwards Charles V. Except during a brief interval, Ferdinand retained the government of Castile as regent until his death, Jan. 23, 1516. The character of Ferdinand is summed up in the story of his reply when told that Louis XII complained that he had cheated him once. "He lies; I have cheated him thrice." See Hist. of the Reign of Ferdinand and Isabella, W. H. Prescott, ed. J. F. Kirk, repr. 1902. See illus. p. 2158.

**Ferdinand VI** (1712-59). King of Spain. The second son of Philip V, he was born Sept. 23, 1712, and ascended the throne in 1746. He immediately set himself to carry out internal reforms, having first concluded the peace of Aix-la-Chapelle, 1748. At the outbreak of the Seven Years' War in 1756 he declared his neutrality. Three years later, broken-hearted at the loss of his wife, Maria of Portugal, his reason gave way, and he died Aug. 10, 1759. The crown of Spain passed to his half-brother, Charles III of Naples.

**Ferdinand VII** (1784-1833). King of Spain. Son of Charles IV, he was born Oct. 14, 1784, and five years later became prince of Asturias.



**Ferdinand VII,  
King of Spain**

In opposition to his father, in 1806 he approached the court of France with the project of marrying one of Napoleon's nieces. He was imprisoned by his father, but the French invasion of Spain caused the latter to abdicate in Ferdinand's favour in 1808. Charles, however, appealed to Napoleon, and withdrew his abdication, and Ferdinand went into retirement. After the Peninsular War in 1814 Napoleon reinstated Ferdinand. A reign of terror followed, and such chaos and rebellion prevailed that in 1823 a French army was sent to establish Ferdinand on his throne. To secure the succession for his daughter, Isabella, in 1830 he abolished the Salic law as applying to the Spanish throne, thus excluding his brother Carlos, an act which led to grave complications later. He died Sept. 29, 1833, and Isabella came to the throne under the regency of Maria Christina. See Carlists; Spain; History.

**Ferdinand I** (1751-1825). King of the Two Sicilies. Born in Naples, Jan. 12, 1751, when his father ascended the Spanish throne as Charles III in 1759, he became his successor as king of Naples and of Sicily. In 1768 he married Maria



**Ferdinand I, King  
of the Two Sicilies**

Carolina of Austria, and was completely dominated by her violent and tyrannical nature.

After the short-lived Parthenopean Republic (1799), in the bloody repression of which Nelson, deluded by Lady Hamilton and Maria Carolina, played a part, Ferdinand oppressed his subjects still more. He aided the Austrians against Napoleon, who sent troops to occupy Naples, whereupon Ferdinand fled to Sicily, and Joseph Bonaparte was proclaimed king in his place. In 1815 Murat, who had succeeded Joseph as king in 1808, was deposed, and Ferdinand returned to vent his spite on the populace by the indulgence of an inconceivable tyranny and cruelty. Uniting Naples and Sicily, he became the first king of the Two Sicilies. At the suggestion of the European powers he promised various reforms, but consistently with the whole tenor of his life he broke all his oaths and repudiated his own signature. He died on Jan. 4, 1825.

**Ferdinand II** (1810-59). King of the Two Sicilies. Born at Palermo, Jan. 12, 1810, he succeeded to the throne at the age of 20, inaugurating his reign with the promise of many reforms. His despotic and cruel nature soon showed itself, however, and before long the kingdom was groaning under oppression and corruption. The insurrections of 1837, 1843, and 1844 culminated in a rising in Sicily and Naples, 1848, which terrified him into granting a constitution. The crushing of Italian hopes after Novara, 1849, encouraged him to annul this, and in order to quell the revolutionary spirit he caused Messina and Palermo to be bombarded, thus earning the nickname of King Bomba. Those who showed liberal tendencies were imprisoned to the number of about 30,000 under



**Ferdinand II, King  
of the Two Sicilies**

conditions which Gladstone, who visited the country in 1851, exposed, describing Ferdinand's rule as the "negation of God." He died May 22, 1859.

**Ferdinand** (1769-1824). Grand Duke of Tuscany. Born May 6, 1769, he was a younger son of the emperor Leopold II. In 1790, when his father became German emperor, he succeeded to the grand duchy of Tuscany. In 1799 he was deposed by the French, in 1802 was made elector of Salzburg, and in 1806 became grand duke of Wurzburg. He was restored to his Tuscan throne in 1814, and by his liberal government saved his people from the misfortunes which overtook their neighbours on the restoration of the old monarchies. He died June 18, 1824, succeeded by his son Leopold II.

**Fère-en-Tardenois.** Town of France, in the dept. of Aisne. It is on the river Ourcq, 12 m. N.N.E. of Château-Thierry, and was prominent in the Great War. It was the British G.H.Q. during the first battle of the Aisne. The Germans reached it on May 30, 1918, in their thrust for Paris. It was recaptured by the Allies on July 28, 1918, with 2,000 prisoners. See Aisne, Third Battle of the Marne, Second Battle of the.

**Ferentino** (anc. *Ferentinum*). City of Italy, in the prov. of Rome. It stands on an eminence, at an alt. of 1,290 ft., 48 m. by rly. E.S.E. of Rome. It has extensive remains of the fortifications of the ancient city, including two gateways. It has a fine cathedral with mosaic floors, and there are a few Gothic churches. The town carries on trade in oil and wine. Pop. 12,928.

**Ferg.** **FRANZ DE PAULA** (1689-1740). Austrian painter. Born at Vienna, he studied under his father, Pancrazius Ferg, J. Orient, and Jean Graff; and painted landscapes in the manner of Poelenberg and genre in the Flemish style. After some years at the court at Dresden, he visited Brunswick, and then London, where, after enjoying some years of affluence, he died in poverty.

**Ferghana.** Prov. in Russian Turkistan, W. Asia, between Syrdaria in the N. and Semirychensk in the N.E. Its area is 55,483 sq. m. Much of the land is barren and hardly fit for pasturage, but is rich in minerals—coal, lead, graphite, and petroleum. The silk industry has long been famous. The chief towns are Khokand, Marghilan, and Andijan. Ferghana, once part of the ancient Sogdiana, was formed from the old khanate of Khokand, and was annexed by Russia in 1876. Pop. 2,169,600.

**Fergus.** River of Ireland. It rises in the N.W. of co. Clare and flows S.E. for 25 m. to its estuary at Clare village. The estuary, about 10 m. long and 4 m. in extreme breadth, is dotted with green islands and contains salmon.

**Ferguson, ADAM** (1723-1816). Scottish philosopher. Born at Logierait, Perthshire, June 20, 1723, he was educated at Perth and the university of St. Andrews. He became an army chaplain, and was present at Fontenoy and elsewhere with the Black Watch. He was then a private tutor until in 1759 he was chosen professor of natural philosophy at Edinburgh. He retained his post there until 1785, and lived until Feb. 22, 1816. Ferguson is known by his *Essay on the History of Civil Society*, and his philosophy elaborated in his *Institutes of Moral Philosophy*, 1772, and *Principles of Moral and Political Science*, 1792. He wrote also a *History of the Progress and Termination of the Roman Republic*, 1783.

**Ferguson, JAMES** (1710-76). Scottish astronomer. Born April 25, 1710, near Rothiemay, Banffshire, he attended Keith grammar school for a few months. At 10 years old he became a farm hand, and looked after sheep, watching the stars at night. He returned home

broken in health, but his ingenious construction of a clock attracted the attention of Sir James Dunbar, who took him into his own household. In 1734 he went to Edinburgh, where he painted miniatures. In 1743 he removed to London, and was elected a F.R.S. in 1763. He became a popular lecturer on experimental science, but was specially noted as an inventor of astronomical and other instruments. He died in London, Nov. 16, 1776.

**Ferguson, ROBERT** (c. 1637-1714). Scottish conspirator and pamphleteer, known as "the Plotter." Born in Aberdeenshire, he came to England about 1655, and was appointed to the living of Godmersham, Kent, from which he was ejected in 1662 by the Act of Uniformity. He took part in the various plots against Charles II, James II, and William III, but always succeeded in escaping from justice. His writings include a *History of the Revolution*, 1706, and *Qualifications requisite in a Minister of State*, 1710.

**Ferguson, SIR SAMUEL** (1810-86). Irish poet and antiquary. Born at Belfast, March 10, 1810, and educated at Trinity College, Dublin, he was called to the Irish bar in 1838. Deputy keeper of the public records of Ireland in 1867, he was knighted in 1878. He died Aug. 9, 1886.



*Sam Ferguson*

His poems, for the most part metrical versions of Irish legends, comprise *Lays of the Western Gael*, 1865; *Congal*, an epic poem, 1872; and a second volume of *Lays, Poems*, 1880. He helped to prepare the way for the Gaelic revival.

**Fergusson, SIR CHARLES** (b. 1865). British soldier. Born in Edinburgh, Jan. 17, 1865, he succeeded to his father's baronetcy in 1907.

Educated at Eton and Sandhurst, he joined the Grenadier Guards, 1883, and in 1896 transferred to the Egyptian army. He saw service in Egypt, being wounded and winning the D.S.O. He returned to England to take command of the 3rd Grenadiers in 1904. From 1909-13 Ferguson was inspector of infantry, and in 1913 was appointed to the 5th division, which he led in the retreat from Mons. He took over the command of the 2nd corps in 1915, and in 1917 was at the head of the 17th, which he led in the final offensive of 1918. He was military governor of Cologne from 1918 to Aug., 1919. He was appointed governor-general of New Zealand, 1924.

**Fergusson, ROBERT** (1750-74). Scottish poet. Born in Edinburgh, Sept. 5, 1750, he studied at St. Andrews University, and entered the office of the commissary clerk at Edinburgh. In 1771 he began to contribute poems, mostly in the Scottish dialect, for Ruddiman's *Weekly Magazine*, and these appeared in collected form in 1773. He died Oct. 16, 1774, largely as the result of convivial excesses. His work greatly influenced Robert Burns, who in 1789 composed the epitaph for the headstone of his grave in Canongate churchyard. See *Life*, A. B. Grosart, 1898.

**Feriae.** Sacred festivals or holidays of ancient Rome. The most important were the *Feriae Latinae*,



Sir Charles Fergusson.  
British soldier  
Barrett



James Ferguson,  
Scottish astronomer  
From a print

the great Latin festival. During the holding of the feriae the city was in charge of special officials and no business was done. See Festival.

**Ferial and Festal.** Terms used in music. In the Christian Church ferial signifies any day not specially observed either as festal or penitential, and the music is of a simpler order on ferial than on festal days.

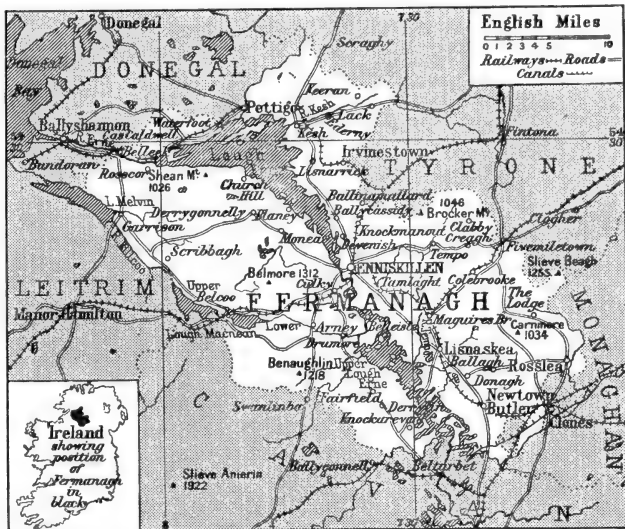
**Feringhi** (Pers. *farangi*). Corruption of Frank, the name given by Asiatics to a European. It is now generally used as a term of contempt.

**Fermanagh.** Inland county of Ireland, in the prov. of Ulster. The irregular surface is marked by numerous hills, the highest of which, wholly within the county, is Belmore (1,312 ft.). Lough Erne consists of two lakes, the Upper and Lower. Enniskillen is the co. town. Agriculture is engaged in, coal, iron, and building stones are found, and the lakes supply salmon. The G.N.I. and other rlys. serve the county. Two members are returned to Parliament. Tumuli, raths, castle ruins, and a round tower are among the antiquities. Area, 653 sq. m. Pop. 61,636.

**Fermat, PIERRE DE** (1601-65). French mathematician. Born at Beaumont-de-Lomagne, Aug. 17, 1601, he early showed remarkable mathematical ability, especially with regard to the theory of numbers, upon which he has left his mark. Most of his work was not published till after his death, and some of his more important treatises have been lost. He died at Toulouse, Jan. 12, 1665.

**Fermentation** (Lat. *fervere*, to boil). Result of the action of organic substances known as ferments. In 1680 the Dutch microscopist Leuwenhoeck showed that yeast consists of definite globules, but only in 1836 was it settled that yeast cells originated fermentation.

Latour first observed that the cells were living organisms, and his "vital hypothesis," violently opposed by Liebig, was supported by Pasteur, who in 1857 gave it as his opinion that "the chemical action of fermentation is essentially a correlative phenomenon of a vital act, beginning and ending with it. I think that there is never any alcoholic fermentation without there being at the same time organization, development, multiplication of globules, or the continued consecutive life of globules already formed." In fermentation the amount of matter consumed and changed into other compounds is much greater than the size and weight of the consuming organisms. Yeast globules decompose many



Fermanagh. Map of the Ulster province containing Lough Erne, famous for salmon and trout fishing

times their weight of sugar and produce a relatively large quantity of alcohol and carbon dioxide. Experimental work has thoroughly determined the action of ferments, and also that each particular organism has its special products of fermentation. All ferments are nitrogenous organic substances whose activity is destroyed by high temperatures.

They are organized and unorganized, the difference being that an organized ferment is one which does not leave the living cell during the progress of fermentation, whereas the unorganized ferment is shed out of cells and then exerts its activity. Unorganized ferments are known as enzymes or chemical ferments. Organized ferments, which will be considered first, are divided into moulds or fungi, yeasts or saccharomycetes, bacteria or schizomycetes.

#### Moulds and Yeasts

Moulds are the most highly organized of the ferments, in that cell-wall and protoplasmic contents are distinguishable in the microscopic cells. The best known moulds are *Mycoderma cerevisiae*, which causes mould in beer; *Penicillium glaucum*, the green mould that forms on bread, jam, etc.; *Aspergillus glaucus*, a similar fungus; *Micrococcus prodigiosus*, which causes red bread; *Puccinia graminis*, the "rust" or mildew of wheat; *Ustilago segetum*, the "smut" of cereal crops; and *Oidium abortifaciens*, which causes ergot on rye.

Yeasts, also called saccharomy-

cetes because they live mostly in saccharine solutions, converting sugar into alcohol, form a group of micro-organisms of the greatest importance in fermentation. Yeast cells are round or oval in shape, and multiply by the process known as gemmation or budding, which goes on indefinitely under proper conditions. In other cases they form spores or new cells liberated by the dissolution of the mother cell.

Although the cells can use oxygen, they appear to be independent of an environment of free oxygen. Time, strength of saccharine solution, and temperature also influence the process of fermentation. The alcohol formed retards the growth of the yeast cell, which ceases action when 14 p.c. of alcohol is formed.

Alcoholic or vinous fermentation is the characteristic function of yeasts. Ethylic alcohol (ordinary alcohol) is formed when sugar is fermented. The higher alcohols, propyl, butyl, amyl, and capryl alcohols, are also produced under suitable conditions. Fembach has recently discovered means of increasing the proportion of amyl alcohol produced during fermentation. From this alcohol artificial rubber is made by the Matthews process. Various forms of starch are used as the source of sugar, which is formed by the action of diastase in the process of brewing. Only the glucoses are capable of direct fermentation.

The chief yeasts are: (1) *Saccharomyces cerevisiae*, the ordinary yeast of the brewer and distiller.

Two kinds are recognized, "high" and "low" yeast, the former rising to the top of the liquid during fermentation and the latter forming a sediment in the vats. High yeast is the one used in English ale fermentation, low yeast producing the lighter lager beer.

(2) *Saccharomyces ellipsoideus* is the ordinary ferment of vinous fermentation by which "must" or grape juice is converted into wine. (3) *Saccharomyces pastorianus* also occurs in wine-making, and when present during brewing gives a bitter taste to the beer.

(4) *Saccharomyces mycoderma* is the cause of "mother" which appears on the surface of wine or beer after exposure for some days to the air.

Hansen, the Danish brewing chemist, has isolated and cultivated two pure yeasts, species of *Saccharomyces cerevisiae*, by using which it is possible to obtain beers of distinctive properties.

**ACETIC FERMENTATION.** It has long been known that when wine is exposed to the air it sours—turns into vinegar—and the manufacture of vinegar wort is an old-established art. It is essentially an oxidation process, and Pasteur first detected the organism, "flowers of vinegar," *Bacillus aceti*, which effects the change. Hansen has detected two distinct species with the same properties. Both require oxygen for their growth, which is most favoured by a temperature of 33° C.

Lactic fermentation produces sour milk. The milk sugar is first split up into lacto-glucose and then into lactic acid by the agency of *Bacillus acidilactici*. A special bacillus, named *Bacillus Caucasicum*, was found by Mechnikoff to be present in the soured milk employed as a beverage under the name "yoghourt."

Viscous fermentation, due to *Pediococcus cerevisiae*, is the cause of "ropiness" in brewing, and a similar condition in bread-making.

#### Nitrification in Agriculture

Nitrification or the oxidation of ammonia into nitrous and nitric acids takes place through the agency of bacteria. Warington's investigations at Rothamsted have shown the importance of nitrification in agriculture. Recently special preparations of nitrification bacteria have been employed commercially in promoting the growth of leguminous plants.

Enzymes or soluble ferments may be defined as substances produced by living plants or animals, and capable of acting catalytically on contiguous compounds. They are thus classified:

**Amylolytic**, which convert starch paste into soluble starch and soluble starch into maltose and dextrose. To this class belong diastase, derived from malt; ptyalin, from saliva; and amyllopsin, from pancreatic juice. **Cellulolytic**, represented by cytase; this is derived from green malt, which dissolves the cellulose walls of grain. **Coagulative**, such as fibrin-ferment from blood, myosin-ferment from muscle, and rennet from gastric juice, which coagulate protein matter. **Emulsive**, which convert glucosides into glucose and other compounds. Examples are emulsin, obtained from almonds, and myrosin, from mustard. **Inversive**, such as invertase from yeast and invertin from intestinal juice, which convert sucrose into glucose, and maltase from yeast, which changes maltose into glucose.

#### Enzymes in Industry

**Proteolytic** enzymes convert proteins into peptones. Examples are pepsin from gastric juice, trypsin from pancreatic juice and papain from *Carica papaya*. **Steatolytic** enzymes, of which steapsin of the pancreatic juice is an example, separate fats into fatty acids and glycerin. **Zymase** obtained from yeast converts sugar into alcohol and carbon dioxide.

Enzymes play a considerable part in several important industries, such as brewing and leather making. In the preparation of rubber, the drying of tea, and the curing of tobacco the proper treatment of the vegetable enzymes contained in these substances determines the quality of the products. In drying drugs the activity often depends upon the prompt killing by heat of the enzymes in the plants. Special processes have been evolved in which the vapour of boiling alcohol is employed for this purpose.

**Putrefaction** is the process of fermentation of nitrogenous organic matter, especially albuminoids, accompanied by the production of evil-smelling gases. The process is due to micro-organisms, the decomposing substances yielding, among other organic bases, methylamine, trimethylamine, and the important bodies known as ptomaines. Many of the ptomaines are very poisonous. They are produced readily in decaying meat and fish, and when introduced into the human body give rise to very serious blood poisoning. See **Brewing**; **Distilling**; **Liebig**; **Pasteur**; **Sterilization**.

**Fermo** (anc. Firmum Picenum). City of Italy, in the prov. of Ascoli Piceno. It stands on an eminence, rather more than 1,000

ft. high, 4 m. from the Adriatic and 36 m. by rly. S.E. of Ancona. Enclosed by battlemented walls, it contains a 13th century cathedral, a town hall and library, besides remains of Roman buildings. Porto San Giorgio, its port, exports grain, wool, and silk. Fermo was founded by the Romans in 264 B.C., and was a free city from 1199 to 1550, when it fell to the papacy. Pop. 7,000.

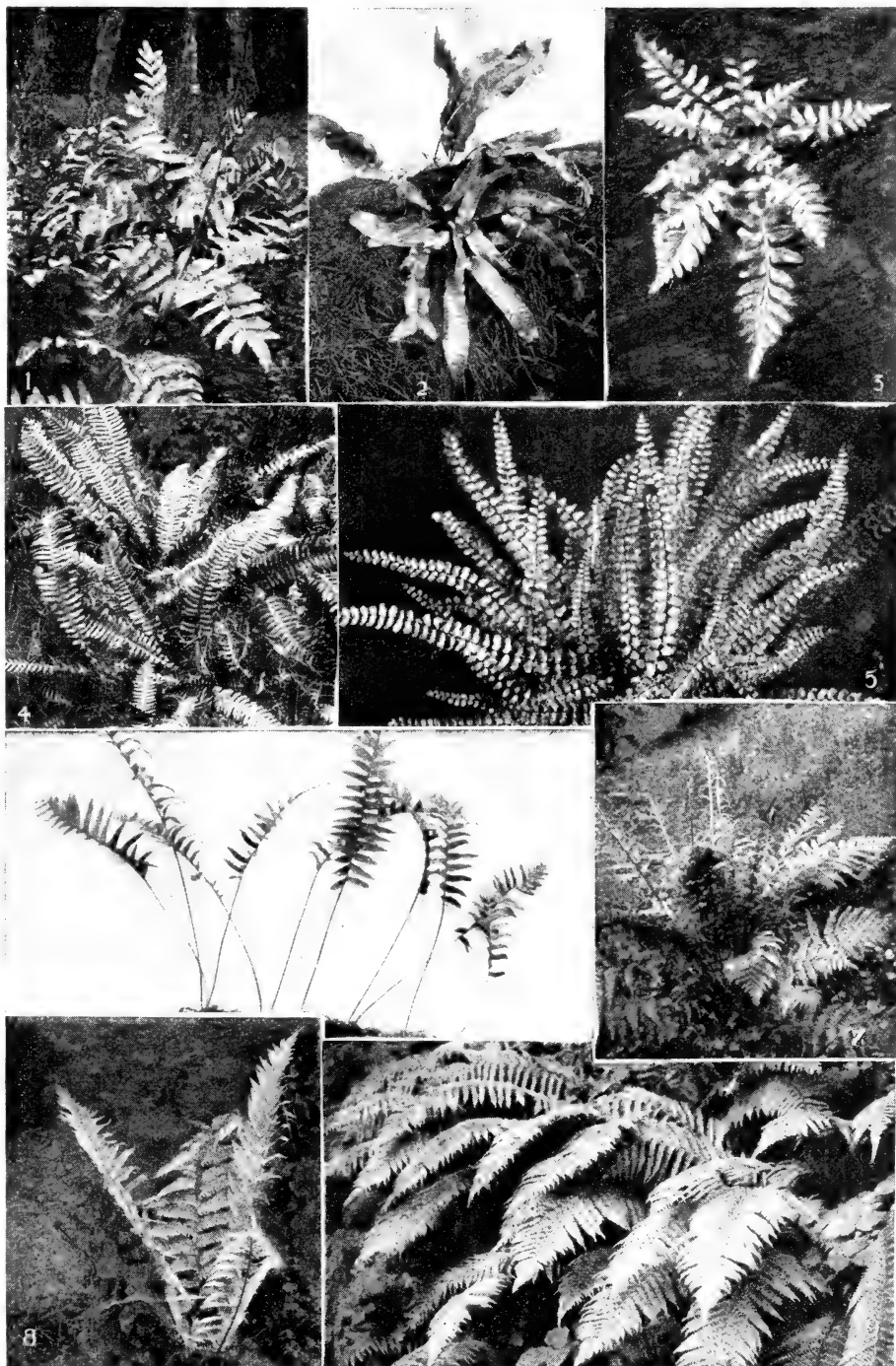
**Fermoy**. Urban dist. and market town of co. Cork, Ireland. It stands on the Blackwater, 15 m. E. of Mallow, on the G.S. & W.R.



Fermoy, Ireland, the Roman Catholic church of S. Patrick

Its importance is chiefly due to the efforts of John Anderson, a Cork merchant, who began to build here in 1791, and later gave a site for the erection of military barracks and founded Fermoy college. The town contains a Roman Catholic cathedral and S. Colman's Roman Catholic college. Salmon and trout fishing is engaged in, and a trade in corn carried on. There is a race-course in the vicinity. Fermoy was the scene of rioting on June 28-29, 1920, when the military wrecked a number of buildings as reprisal for the capture of General Lucas. Market day, Sat. Pop. 6,863.

**Fern** (*Pteridophyta*). Most highly organized division of the flowerless plants (Cryptogamia), which are characterised in the main by being built solely of cells. Pteridophytes alone of the cryptogams possess vessels. They are mostly perennial herbs, only a few being annuals. A few others have shrubby roots or woody trunks, e.g. the tree-ferns. Besides the ferns proper, the pteridophytes include the horsetails and club-mosses, all agreeing generally in their mode of reproduction. This is known as the Alternation of Generations. As it has been tersely put by a modern writer: "Of four successive generations of fern-life,



1. Royal fern, *Osmunda regalis*. 2. Hart's-tongue, *Phyllitis scolopendrium*. 3. Sea spleenwort, *Asplenium marinum*. 4. Hard fern, *Blechnum spicant*. 5. Maidenhair spleenwort, *Asplenium trichomanes*. 6. Common polypody, *Polypodium vulgare*. 7. Lady fern, *Athyrium filix-foemina*. 8. Male fern, *Lastrea filix-mas*. 9. Prickly shield fern, *Polystichum aculeatum*

FERN: SPECIES FOUND IN THE BRITISH COUNTRYSIDE



generations 1 and 3, though agreeing each with the other, will differ widely from generations 2 and 4, though they are all in the direct line of descent one from another."

The furry, red-brown patches on the back of the fern-leaves consist of thousands of minute capsules (sporangia), each containing about 64 microscopic spores. Each spore under suitable conditions develops, not into a fern like that by which it was produced, but into a tiny heart-shaped green scale (prothallium), which bears on its under surface two kinds of sexual organs—the counterpart of the anthers and ovaries of flowering plants. The male organs (antherids) contain motile bodies termed antherozoids, which find their way to the female organs (archegones) and fertilise them. The result is the production of an embryo from which in due course arises a leafy fern-plant like that which produced the spore. This leaf-bearing form is known as the sporophyte generation, and the prothallium as the oophyte generation.

From the gardener's point of view hardy ferns are valuable to fill moist, shady places for which the choice of flowering plants is limited, but the use of exotic ferns except as specimens, or in elaborate winter gardens, has fallen into disuse, since some consider that the space they occupy can be employed to greater advantage by flowering plants. This, however, is purely a matter of taste; the beauty of the fern is lasting, that of the flower ephemeral.

Hardy ferns are not particular as to soil, though to obtain the best results a mixture which contains a considerable percentage of well-decayed leaf-mould or peat is desirable, or, failing this, some old stable manure should be mixed with the loam when making up the bed. The situation is more important; the north side of a wall or hedge, where less hardy things are difficult to grow, will suit ferns admirably. It is well not to plant them too near ivy, however, as this climber is so greedy a feeder that it speedily takes all the nourishment away from the ferns, especially if they are of choice kinds. The ordinary brake fern, or bracken, will grow anywhere, but except for very smoky and shady town gardens, its employment in any quantity is not recommended as it is a greedy feeder.

Exotic ferns should be taken in hand in early spring, when the new growth starts. They will thrive in any ordinary potting mixture, one which contains a liberal admixture

of silver sand for preference, and they may be shifted into larger pots when necessary, at any time of the year except the winter. Ferns are most easily increased from spores, which are found upon the undersides of the leaves. When these are ripe the most fruitful leaf or leaves should be severed from the

parent fern, and stored away in a box or piece of paper for a few days, and kept dry until the spore cases burst. The spores should then be lightly sown upon the surface of a box of finely sifted potting soil, and kept moist. Tiny ferns will appear in the course of a few weeks, and these should be very carefully potted into thumb-pots when large enough to handle, and afterwards repotted as desired. When ferns such as the maidenhair, ribbon-fern, or any of the native species have been grown in the greenhouse, it will be found that the top-soil of the pots is already sown with their spores. If this is removed to a shallow pan and covered with glass, it will soon be covered with prothallia. Observation of the evolution of the adult fern from this beginning is a valuable lesson in botany.

Gold and silver ferns are popular names given to several species to denote their appearance. It is due to the under surface of the leaves being coated with fine particles of white or yellow wax, which looks silvery or golden. *Cheilanthes argentea*, an Asiatic species, is an example of a silver fern. Others of the same genus are *C. clelandii* (N. America), *C. eatoni* (W. United States), and *C. farinosa* (Tropics). The genus *Gymnogramma* also affords examples of silver ferns in *G. chrysophylla* (Tropics), *G. decomposita* (S. America), and *G. sulphurea* (W. Indies).

**Bibliography.** Structure and Development of Mosses and Ferns, D. H. Campbell, 1895; Book of British Ferns (with special reference to the raising of fancy varieties), C. T. Drury; Wayside and Woodland Ferns, with Figures of all the British Species, E. Step, 1908.

**Fernandez, JUAN** (c. 1536-1602). Spanish navigator. A native of Cartagena, Fernandez spent his life as a pilot on the Pacific coast. In 1571 he discovered the island now called by his name, on which he vainly tried to settle some Indians. His skill as a sailor won



Ferney. The château built by Voltaire in 1758, and his home for twenty years

him the nickname of the wizard, and also brought him under the notice of the Inquisition.

**Fernando de Noronha.** Island in the Atlantic, belonging to Brazil. It is about 200 m. E.N.E. of Cape St. Roque, 8 m. long by  $1\frac{1}{2}$  m. wide, is of volcanic origin, reaching an elevation of 1,100 ft., and has several good harbours protected by forts. The surface is rugged, but fertile, producing cereals, cotton, and fruit. At Remedios (pop. 2,100) is a convict settlement, with a cable and wireless telegraph station. The island was discovered by a Portuguese navigator, whose name it bears.

**Fernando Po.** Island in the Bight of Biafra, belonging to Spain. The key to this portion of the African coast, it is mountainous, fertile, and beautiful. Of volcanic origin, it is 35 m. long and 22 m. broad. Densely forested in the N. and covered in most parts with luxuriant vegetation, it yields sugar-cane, bananas, and yams, while cotton, coffee, rice, tobacco, and cinchona are cultivated. The highest mt., Clarence Peak, 10,190 ft., is called by the Spaniards Pico Santa Isabel. The island is inhabited by a Bantu tribe, the Bubis, and a few negroes.

Santa Isabel, the chief town, is the administrative capital of the Spanish possessions in the Bight of Biafra. Rubber and palm oil are exported. The climate is considered unhealthy. The island is named after its Portuguese discoverer, Fernão do Po, who sighted the island in 1471, and it was ceded to Spain in 1778. Area, 1,185 sq. m. Pop. about 19,000, of whom some 500 are Europeans. See From the Congo to the Niger and the Nile, Adolphus, duke of Mecklenburg-Schwerin, 1913.

**Ferndale.** Eccles. district and village of Glamorganshire, Wales. It is 6 m. N.W. of Pontypridd, on the Taff Vale Rly. There are extensive collieries in the neighbourhood. Pop. 18,144.

**Ferney** OR **FERNEY-VOLTAIRE**. Village of France, in the dept. of Ain. It stands near the Swiss frontier, 4 m. N.W. of Geneva. The château de Ferney was built by Voltaire, who lived in it from 1758 to 1778; it contains numerous memorials and personal relics of the philosopher, who in 1768 founded a watch factory, which at one time employed 800 hands. In the town-hall is a statue to Voltaire (*q.v.*), and his name was officially added to the town in 1878. Pop. 1,172.

**Fern Palm** (*Cycas revoluta*). Tree-like perennial of the natural order Cycadaceae. A native of China, it has a stout stem, in old individuals as much as 7 ft. high, crowned by the arching, palm-like leaves. These are cut into narrow segments in a feather-like manner, and vary in length from 2 ft. to 6 ft. The reproductive organs are found in the heart of the leaf-crown: the males in cones, whose scales bear anthers on their under surface; the females bearing ovules in the marginal notches of woolly, leaf-like organs.

**Ferns**. Town of Ireland, in co. Wexford. It stands on the Bann, 74 m. S. of Dublin by the Dublin and S.E. Rly. Its interest is wholly historical. It was long the seat of a bishop, and has a modern church, formerly the cathedral. Other buildings of interest are the episcopal palace, the ruins of the castle, of a church, and a monastery. The town grew up around a monastery founded by S. Edan about 600. The kings of Leinster had a palace here, and here the Norman invaders built a castle. The diocese was united with Ossory in 1836. James I made it a chartered town, and until 1800 it sent two members to the Irish Parliament.

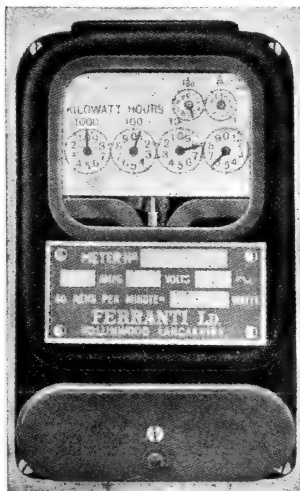
**Ferozepore**. District and town of the Punjab, India. The area of the district is 4,286 sq. m. There are no important manufactures; the chief crops are wheat, gram, barley, and millet. Half the cultivated area is irrigated. Ferozepore town is situated at the junction of the Rajputana and North-Western Rlys., some 4 m. from the Sutlej. It is the site of a large cantonment, and has an arsenal; it is also the centre of a considerable grain trade. Pop. dist., 959,657, 25 p.c. Hindus, 25 p.c. Sikhs, 50 p.c. Mahomedans; town, 50,836, 42 p.c. Hindus, 47 p.c. Mahomedans. The Jats are the chief tribe.

**Ferozeshah**, **BATTLE OF**, British victory in the first Sikh war. On Dec. 21, 1845, Sir Hugh Gough, who had just won the victory of Moodka, advanced against the Sikhs, and after a violent cannon-

ade attacked with his infantry. The first British attack was repulsed with heavy loss. In the second effort the Sikhs were routed, losing 73 guns. See Sikh Wars.

**Ferragus**, **FERRACUTE**, **FERRAUTE**, OR **VERNAGU**. Giant of early French romances. In the Charlemagne legends he overcomes all that monarch's paladins except Roland, by whom he is slain. In Ariosto's Orlando Furioso he is a Saracen who threw away his helmet, declaring that he would never wear another until he had won that of Orlando, by whom he was killed.

**Ferranti Meter**. Type of electrical meter invented by S. Z. Ferranti, in 1883. It consists of an



Ferranti Meter. Front of the instrument used for measuring electric currents

electro-magnet containing mercury in the shape of a thin disk. The rotation of this disk serves as a measure of the strength of the current passing through the meter. See Meter, Electrical.

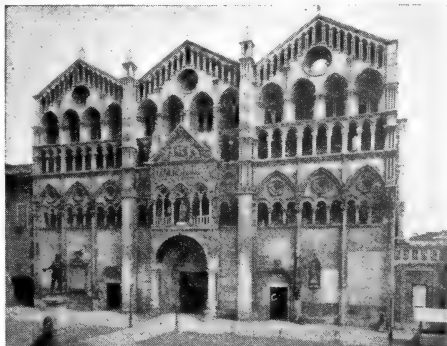
**Ferrar**, **NICHOLAS** (1592–1637). English theologian and founder of the Little Gidding community. Son of a London merchant, he was educated at Clare Hall, Cambridge, and worked for the Virginia Company, 1619–23. He was elected to Parliament in 1624, but in 1625 retired, with his mother and brother-in-law, Collet, and their families, to the

manor of Little Gidding, Huntingdonshire, to a secluded life of devotion, study, and good works. In 1626 he was ordained deacon by Laud. He died Dec. 4, 1637.

The members of Little Gidding household were famed for their skill in embroidery, bookbinding, and "scrap book" making, and examples survive in the British Museum and elsewhere of cunningly constructed "harmonies," or "concordances" of the Bible, illustrated with prints collected by Ferrar on his travels. The "Arminian Nunnery," as it was called, was twice visited by Charles I, and was broken up by the Puritans in 1647; it figures in J. H. Short-house's philosophical romance John Inglesant, and in Izaak Walton's Life of George Herbert.

**Ferrar**, **ROBERT** (1500–55). English divine and martyr. He studied at Oxford, was ordained, and later was head of a religious house in Yorkshire, but only became prominent on the accession of Edward VI. Owing to the influence of Somerset he was made bishop of St. Davids. He was a zealous reformer, but charges were brought against him, and Somerset having fallen from power, he was imprisoned in 1552. In 1554 his bishopric was taken from him, and he was put on his trial. Found guilty, he was burned at Carmarthen, March 30, 1555. The chief charge against him was that he had violated his vow of chastity by marrying.

**Ferrara**. Prov. of N.E. Italy. It is bounded N. by the river Po and E. by the Adriatic Sea. Area, 1,019 sq. m. Low-lying and marshy in parts, it lies mostly within the delta formed by the Po and its branches and by the Primaro and the Panaro, and embraces the lagoons of Comacchio (*q.v.*). Fairly fertile, it produces rice, grain, wine, hemp, silk, salt, and fish. The capital is Ferrara. Pop. 326,447.



Ferrara. Façade of the cathedral of S. George, in the city of Ferrara, the lower part dating from 1135

**Ferrara.** City of Italy, capital of the prov. of Ferrara. It stands about 3 m. S. of the river Po di Volano, 39 m. by rly. N.N.E. of Bologna. An archiepiscopal see, its cathedral dates from the early 12th century. The city is surrounded by crumbling walls, but its palaces and other structures attest its former splendour. It was the seat of the court of the family of Este (*q.v.*), and their castle (now utilised as public offices) was a moated fortress with four towers. The university was founded in 1264, and its library is rich in MSS. of Tasso, etc. Among other buildings of interest are a picture gallery, and the houses of Ariosto and Guarini.

From the 14th to the 17th century Ferrara was a prosperous city, and in the 15th was noted for its school of painting. It has a trade in hemp, soap, wax, candles, glass, and silk. Guarini and Savonarola were natives. It came into the possession of the Este family in 1146, and was their capital until 1598, when it passed to the papacy. Pop. 102,550.

**Ferrara, ANDREA**, Italian sword-maker of the 16th century. He was working in Belluno in 1585, and swords bearing his name were used in Scotland in the 16th and 17th centuries. The steel had a temper which was claimed to be that invented by the swordsmiths of Damascus. The name Andrea Ferrara was afterwards employed rather as a trademark than as implying any connexion with the original maker.

**Ferrara-Florence, COUNCIL OF.** Oecumenical council of the Church held at Ferrara, and later at Florence, between April, 1438, and July, 1439. It was called by Pope Eugenius IV as a continuation of the council of Basel, and had as its main object the healing of the breach between the Roman and Greek churches. The Latin emperor, John Palaeologus, representing the Greeks, brought a large delegation at the pope's invitation to Ferrara. The scene of the council was changed to Florence in Jan., 1439. The debates turned chiefly on the Filioque controversy, *i.e.* the question whether the Holy Ghost proceeds from the Father and Son (*ex Patre Filioque*), or from the Father alone. On July 6 a decree was published which declared that, 'while the pope was the supreme head of all the Church, the rights of the Eastern patriarchs were to be unaffected.

The two churches were thus momentarily united in intention, but not in effect. Isidore of Kiev was sent as legate to Constanti-

nople by Pope Nicholas V in 1452, in order to push the process of union forward, but before he had accomplished his mission the city was taken by the Saracens, 1453. This undid the work of the council, the last effort at Eastern and Western reunion.

**Ferrel, WILLIAM** (1817-91). American meteorologist. Born in Bedford co., Pa., he early turned his attention to the study of meteorology, then a neglected science, and his researches soon won him world-wide fame. In 1867 he became a member of the United States coast and geodetic survey, and began to formulate the laws of meteorology on a scientific basis. His invention of a tide-predicting machine came into general use in the U.S. government coast surveys. He wrote much on his subject, including *Tidal Researches*, 1874; *Meteorological Researches*, 1877-82; and *Popular Treatise on the Winds*, 2nd ed. 1898.

**Ferrel's Law.** Law of the deflection of bodies moving in the air of the rotating globe. If a body moves in any direction except E. or W. on the earth's surface, the rotation of the earth will cause it to be deflected to the right in the northern hemisphere, and to the left in the southern hemisphere. The law is an example of the general case in mechanics when a body acted upon by two forces moves in a direction compounded of the original directions of the forces. In the northern hemisphere a body forced northwards receives an eastward impulse from the earth's rotation, and moves towards the north-east.

**Ferrer, FRANCISCO** (1859-1909). Spanish revolutionist. Born near Barcelona, he was employed as a



Francisco Ferrer, Spanish revolutionist

railwayman, 1877-85, devoting attention to the study of socialism and rationalism. He was closely associated with the activities of the republican agitator Zorrilla, with whom he lived in Paris. He returned to Barcelona in 1901, and was prominent in founding lay schools and centres of advanced socialist and rationalist teaching. In June, 1907, he was acquitted of having taken part in the attempt to assassinate the king in 1906. In July, 1909, he was active in the insurrections in Barcelona, aiming at the establishment of a new anti-Catholic state in Catalonia. Con-

demned as the prime instigator, he was shot on Oct. 13, 1909, his execution raising much indignation, directed mainly against Roman Catholic influence in Spanish politics, and leading to the fall of the Maura cabinet.

**Ferrers, EARL.** British title borne since 1711 by the family of Shirley. The family of Ferrers, ancestors of the Shirleys, first appeared in England with William the Conqueror, having previously been powerful in Normandy. Henry Ferrers was a great landholder under the Conqueror, especially in the North Midland counties, and his son Robert was made earl of Derby in 1138. His successors, who had Tutbury Castle for their main stronghold, were known as earls Ferrers or earls of Derby. William, the 4th earl, was one of the richest and most powerful nobles of the time of Henry III, as was his son, the 5th earl. Robert, the 6th earl, having rebelled against the king, lost his lands and title.

The family, however, survived in several branches. Robert's son, John, was summoned to Parliament in 1299 as Baron Ferrers of Chastley, this being one of the family seats. This title passed to the family of Devereux in 1461 and remained therein until 1646, when it fell into abeyance.

The Shirleys became connected with the title through the marriage of Sir Henry Shirley, Bart., with the daughter of Robert Devereux, 2nd earl of Essex. In 1677 Sir Robert Shirley, a descendant of Sir Henry, was allowed to assume the baronial title, and in 1711 he was made Viscount Tamworth and Earl Ferrers. On his death in 1717 the barony passed to a granddaughter, Elizabeth, wife of the 5th earl of Northampton, while a son became the 2nd Earl Ferrers.

The barony passed to other families and fell into abeyance in 1855. Laurence, the 4th earl (1720-60), was the last peer in England to be executed as a felon. In 1745 he succeeded to the title on the death of his uncle. In a moment of anger he shot his steward, a man named Johnson, and was tried for murder by his peers in Westminster Hall. Found guilty, he was hanged at Tyburn, May 5, 1760. The story that he was hanged with a silken rope is now disbelieved. The titles passed to his brother, Washington, who became the 5th earl. His descendants held them until the 10th earl died in 1912, when an heir was found in a descendant of the 1st earl, Walter Knight Shirley (b. 1864). Tamworth Castle, long the family seat, no longer belongs to the Shirleys.

**Ferrers, GEORGE** (c. 1500-79). English politician and poet. He was page of the chamber to Henry VIII, who took him with him in the Scottish and French wars and bequeathed him 100 marks. He is mainly remarkable for having produced and probably written masques for Edward VI's Christmas entertainments in 1551-52 and for having contributed several tragical episodes to Baldwin's *Mirror for Magistrates*, 1559-78.

**Ferret** (*Putorius*). Domesticated variety of the polecat, kept for hunting rabbits. According to Roman writers the polecat came from Africa, and although it is now quite unknown there, it is probable that it was originally domesticated in N. Africa or Spain, and afterwards introduced into Italy. As a result of domestication, the polecat became smaller and slimmer, and albinos became the rule instead of the exception. In this way the



**Ferret.** The domesticated polecat used for rabbiting

ferret developed. It is a somewhat delicate animal, and its intolerance of cold suggests its Mediterranean origin. It breeds readily with the wild polecat, and the brownish variety known as the polecat-ferret is probably the result of such crosses. The ferret is only semi-domesticated. It has no affection for its owner, is very ferocious, and is as likely to bite the hand that feeds it as any other. It therefore needs to be handled with caution, the best way being to grasp it close behind the shoulders.

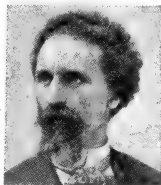
The method of hunting a rabbit warren with ferrets is to net or stop all the holes except one, at which the ferret is inserted. The rabbits, finding an inveterate enemy on their track, bolt for the holes and are thus caught in the nets. It is a common practice to muzzle the ferret, otherwise, if it catches a rabbit in the burrow, it will remain there to make a meal of it.

Ferrets need great care to keep them in good health, warmth and scrupulous cleanliness being the chief essentials. Plenty of warm litter must be provided, and the hutch should be thoroughly cleaned and disinfected at least once a week. The food should consist of fresh bread and milk, and a little raw meat may be given once a

week. Ferrets breed freely in captivity and usually rear two families in the year. See Rabbit.

**Ferrex and Porrex.** One of the titles under which the earliest extant English tragedy is known. See *Gorboduc*.

**Ferri, ENRICO** (b. 1856). Italian socialist. Born near Mantua, Feb. 25, 1856, he was educated in that city and at Bologna, taking a legal degree, 1877, and studying under Lombroso, 1879. In 1880 he became professor of criminal law at Bologna university, and in 1891



**Enrico Ferri,**  
Italian socialist

succeeded the criminologist Carrara at Pisa university. Appointed to a chair in the new university at Brussels, 1895, he received a similar appointment at the Collège des Sciences Sociales at Paris, 1901. A radical deputy, 1886-93, in the Italian chamber, he afterwards joined the socialist party.

**Ferric Salts.** Iron forms with acids, two series of salts, ferrous and ferric. The ferric salts are generally yellowish or reddish brown in colour, and are reduced to the ferrous state by means of zinc. Ferric chloride ( $\text{FeCl}_3$ ) is prepared in the anhydrous state by heating iron wire in a current of dry chlorine gas, and in the form of solution by dissolving iron wire in hydrochloric acid and then passing chlorine into the liquid until it smells of the gas.

As a tincture ("steel drops") ferric chloride is employed in medicine as a tonic. With a soluble thiocyanate, ferric chloride gives an intense blood-red colour. Ferric sulphate,  $\text{Fe}_2(\text{SO}_4)_3$ , obtained by oxidising ferrous sulphate by means of nitric acid, is used in dyeing cotton black, in combination with logwood. Iron alum is a compound of ferric sulphate and potassium sulphate. This and ferric nitrate are employed in dyeing. Ferric oxide, which occurs naturally and is also produced by distilling ferrous sulphate, is known as red ochre and colcothar, and used as colouring matter and polishing material.

**Ferricyanides.** Salts of ferricyanhydric acid,  $\text{H}_3\text{Fe}(\text{CN})_6$ , first made by Gmelin by decomposing lead ferricyanide with dilute sulphuric acid and evaporating the solution after filtration. Potassium ferricyanide or red prussiate of potash is prepared by passing chlorine through a solution of potassium ferrocyanide or over the dry salt until it no longer gives a blue colour with a ferric salt.

The salt is in deep red crystals and forms with water a dark yellow solution which darkens with age and becomes converted into ferrocyanide. On adding ferrous sulphate (green vitriol) to potassium ferricyanide solution a blue precipitate known as Turnbull's blue is obtained. When chlorine is passed into a solution of potassium ferricyanide a green precipitate known as Prussian green is formed, the appearance of which is the indication that the end of the process has been reached. Potassium ferricyanide, a powerful oxidising agent, when employed with caustic potash, is used in the preparation of ferroprussiate paper upon which "blue prints" are made. See Colour Printing.

**Ferrier, SIR DAVID** (b. 1843). British physician. Born at Aberdeen, he was educated at the



**Sir David Ferrier,**  
British physician

*Mauil & For*

university there and at Edinburgh and Heidelberg. Having taken his medical degree at Edinburgh, he began to practise as a specialist and soon won a reputation as an authority on the brain. In 1889 he was appointed professor of neuro-pathology at King's College, London, and he was also consulting physician at King's College Hospital. His many honours include an F.R.S. Ferrier, who was knighted in 1911, wrote *The Functions of the Brain*, etc., 1876.

**Ferrier, JAMES FREDERICK** (1808-64). Scottish metaphysician. Born at Edinburgh, June 16, 1808, he was professor of moral philosophy and political economy at St. Andrews from 1845 until his death, June 11, 1864. Like Berkeley, he is an idealist and immaterialist. There is no such thing as independent matter, all external things exist only subjectively; the only material world which really exists is one with which intelligence also exists. The conscious subject is inseparably connected with the conceived object. At the same time, he does not deny the existence of the real material world *per se*, as distinct from that known to us through the subjective medium of space and time, but declares it to be simply unknowable. His writings are distinguished by a clearness of style extremely rare in the discussion of abstruse subjects. His most important works are *Institutes of Metaphysics*, 1854, and *Lectures on Greek Philosophy*.

**Ferrier, PAUL** (1843-1920). French dramatist. Born at Montpellier, he studied for the bar, but turned to playwriting after the production of his first piece, a verse play, *La Revanche d'Iris*, in 1868. He wrote and collaborated in a large number of opera libretti, comic operas, and comedies, well known in France for their gaiety and humour. Among the most successful were *Les Mousquetaires au Couvent*, 1880; *Tabarin*, 1884; *L'Article 231*, 1891; *La Belle Mère*, 1898. He died at Nouan-le-Fuzelier on Sept. 11, 1920.

**Ferrier, SUSAN EDMONSTONE** (1782-1854). Scottish novelist. Born at Edinburgh, Sept. 7, 1782, she published her first novel, *Marriage*, in 1818, followed by *The Inheritance*, 1824, and *Destiny*, 1831. Published anonymously, they gave a shrewdly satirical picture of contemporary Scottish society, and won great popularity and the praise of critics as eminent as James Hogg and Scott. She was known familiarly as Scott's "sister-shadow," and died at Edinburgh, Nov. 5, 1854. Her *Recollections of Visits to Ashestiel and Abbotsford* were published in 1881. See *Life*, J. Ferrier, 1899.



*Susan Edmonstone Ferrier*

**Ferrite.** Term used in mineralogy for the particles of iron hydroxide which constitute some of the binding elements in many rocks; and also to a particular form of chrysolite. In chemistry it refers to compounds of iron oxide with other oxides more distinctly basic, as in barium ferrite, calcium ferrite, and others; and in metallurgy to the pure iron constituent of steel. See *Steel*.

**Ferro-Concrete.** One of the several names for reinforced concrete. Concrete is reinforced for use as a building material by placing within its substance mild-steel bars which resist the pulling forces that would destroy plain concrete. No other building material is equally fire-resistant, and its ability to withstand all kinds of stresses has rendered possible new methods of construction—balconies or galleries, for example, can be projected without the propping-up from below that would be needed for any other system of construction; and the enormous strength of the material enables the construction of much thinner walls than would be allowable with brick or stone. See *Building*; *Concrete*.

**Ferrocyanides.** Salts of ferrocyanic acid,  $H_4Fe(CN)_6$ . Most ferrocyanides are coloured, and those of the soluble alkalis are non-poisonous, although from them hydrocyanic or prussic acid can be readily prepared. The most important of these salts is potassium ferrocyanide or yellow prussiate of potash. The old process of manufacture consisted in fusing together potassium carbonate with iron borings and nitrogenous animal matter such as leather cuttings or woollen rags, and lixiviating the mass with water. Potassium ferrocyanide is made largely as a by-product in the manufacture of coal-gas. It is used in producing Prussian blue (ferric ferrocyanide) and other cyanogen compounds in calico-printing, and for case-hardening iron.

**Ferrol.** Seaport of Spain, in the prov. of Corunna. It stands on the N. arm of the Bay of Betanzos, and is the chief Spanish naval station on the Atlantic. The harbour is sheltered and commodious, with shipbuilding yards, docks, and quays, defended by both nature and art. It has a first-class arsenal, a naval academy, and many fine public buildings. It manufactures naval stores, leather, sailcloth, cotton and linen, and exports pit-props, vinegar, brandy, and sardines. The British besieged it in 1799, and took it in 1805, after defeating the French fleet off the bay. It was captured by the French after six weeks' blockade in 1823. Pop. 26,270.

**Ferro-manganese.** One of the most important of a series of iron, manganese, carbon alloys now largely used in the preparation of steel. The constitution of the alloy varies according to the character of the metal which it is desired to convert into steel, manganese ranging from 50 p.c. to 80 p.c. The alloy is prepared in blast-furnaces and cast into pigs, in all essentials precisely as ordinary pig-iron is made. See *Bessemer Process*; *Metallurgy*; *Steel*.

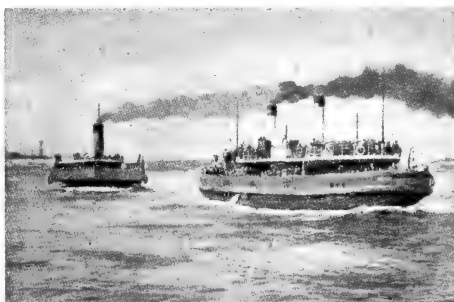
**Ferrous Salts.** Group of iron salts. Ferrous sulphate,  $FeSO_4 \cdot 7H_2O$ , or green vitriol is obtained in large quantities by exposing the pyrites occurring in coal-measures to the atmosphere. The soluble ferrous sulphate together with

the excess of sulphuric acid, runs into underground tanks where the excess of acid is removed by means of scrap iron. The liquid, on evaporation, yields crystals of ferrous sulphate.

Ferrous sulphate is used in the manufacture of ink, in dyeing and tanning, and in the preparation of Prussian blue. The pure salt is used in medicine. Ferrous oxide,  $FeO$ , has the property, when freshly made, of oxidising with incandescence on exposure to the air. Ferrous iodide,  $FeI_2$ , is used in medicine, as are also ferrous phosphate,  $Fe_3(PO_4)_2 \cdot 8H_2O$ , and ferrous carbonate,  $FeCO_3$ . The last-named is contained in chalybeate waters, from which the ferrous carbonate is deposited, on exposure to air, as the hydrated oxide.

**Ferrule.** Short metal tube driven tightly into a hole in an iron or steel pipe and soldered or otherwise secured to another pipe so as to connect the two. It is also a short tapered tube driven into the end of a boiler-tube where it passes through the fire-box plate. The wedging action of the ferrule expands the boiler-tube end and ensures a tight connexion between the boiler-tube and the plate. There are also other types of boiler-tube ferrules. In common speech the word is used of a metal ring on the handle of a tool, and of the thimble-shaped ring fastened to the end of a walking-stick or umbrella to protect it from being worn down by use.

**Ferry.** Public passage-way across water, usually linking up roadways or tracks on both banks. The most usual means of transport is a floating vessel of some kind which, in the case of small loads and short distances, is frequently a flat-bottomed boat, guided by a taut wire cable and propelled by an endless rope. For heavy loads the ferry-boat may be moved to and fro by a windlass on board, which picks up and pays



Ferry. Type of steam ferry-boats formerly in use on the Mersey between Liverpool and Birkenhead.



out a chain crossing the bed of the river. Where there is a strong current in one direction only, the ferry-boat may be attached to a chain the other end of which is moored in midstream some distance higher up, the current being used to move the boat across by oblique pressure. *See* Channel Ferry; Richborough; Train Ferry; also *illus.* p. 2207.

**Ferry, JULES FRANÇOIS CAMILLE** (1832-93). A French statesman. Born at St. Dié in the Vosges, April



**Jules Ferry,**  
French statesman

15, 1832, he became a lawyer and a journalist. In 1869 he was chosen as deputy for Paris, being already known as a vigorous opponent of the emperor. When Paris was besieged, as prefect of the Seine he was responsible for its government. After being minister at Athens, he returned to the Chamber of Deputies in 1873 and entered the ministry in 1879. In 1880 he became premier for a short term, and was again premier, 1883-85, being in the meantime minister for education. In 1885 he retired, but was active in politics until his murder by a lunatic, March 17, 1893, just after he had been chosen president of the senate. Ferry did much to promote secular education, and establish French influence in Africa and Indo-China.

**Ferrybridge.** Hamlet of Yorkshire (W.R.), England. It stands on the Aire, 2 m. N.E. of Pontefract, on the M. & N.E.J.R. In 1461 it was the scene of an engagement during the Wars of the Roses.

**Ferryhill.** Parish and market village of Durham, England. It is 6 m. S. of Durham, on the N.E.R., with ironworks and coal mines. Market day, Fri. (alternate). Pop. 10,133.

**Ferryman's House.** Fortified point on the E. bank of the Yser canal, midway between Dixmude and Ypres, for which there was prolonged fighting in the winter of 1914. The troops engaged were French of the 9th corps. The position was of importance because, if it remained in German hands, the Germans might cross the Yser canal and turn the defences of Ypres, moving by a short line upon Poperinghe, 6½ m. to the rear of Ypres. By attacking at this point the French also took pressure off the Belgians, who were being subjected to artillery fire on the Yser. On Dec. 4, 1914, the French stormed the Ferryman's House, and established themselves there.

**Fersen, FREDRIK AXEL, COUNT VON** (1719-94). Swedish soldier and politician. Of Scottish descent, Fersen was born at Stockholm, and as a young man served with the French army with distinction. In 1748, he fought against Prussia in the Seven Years' War. Marshal of the Swedish diet in 1755, and again in 1769, Fersen was prominent as leader of the aristocratic party (the "Hats"). From 1786 he was an open and powerful opponent of Gustavus III, and was put under arrest for a time in 1789, after which he retired.

**Fersen, HANS AXEL, COUNT VON** (1755-1810). Swedish soldier. Born at Stockholm, Sept. 4, 1755, he served in the Swedish army. Afterwards he resided at the court of Louis XVI of France, with whom he became a great favourite.

During the American War of Independence he fought under Lafayette. When the king and Marie Antoinette, to whom Fersen was devoted, fled to Varennes in 1791, Fersen was the driver of the coach. After his return to Sweden he was murdered by a mob, June 20, 1810, on suspicion of having been concerned in the death of the Crown Prince Christian.

**Fertilisation.** Biological term for the union of the male and female germ-cells which precedes reproduction in almost all multicellular organisms, and in all the higher animals. Plants and animals in which the sexual organs are distinct produce male germ-cells, or sperms, and female germ-cells, or ova, respectively, but unless there is a union at some period or other in the life cycle of the individual between a male and a female germ-cell, these cells perish, and reproduction does not occur. Some few species consist only of female organisms, where fertilisation is absent, and reproduction takes place by parthenogenesis.

In some other species the organism has both male and female reproductive organs in the same individual, and when the respective germ-cells in such a case unite the process is termed self-fertilisation. This occurs in many plants, where the pollen grains (male) unite with the ovules (female), the result being a fertilised ovum. In the higher animals cross-fertilisation, however, is the rule, and in this process the sperm and the ovum which unite come from two distinct indi-

viduals of opposite sexes. Cross-fertilisation takes place in some plants frequently by the pollen grains and the ovules, which are carried on the same plant, ripening at different periods, so that they become fertilised from the corresponding elements of other plants of the same species. The single cell formed by the union of a male and a female germ-cell is termed a fertilised ovum, or a zygote.

Fertilisation is brought about by the activity of the male sperm-cell. Under the microscope this cell is seen to consist of a head and a tail, and the essential part of the process is the fusion of the head of the sperm with the nucleus of the female ovum. After this fusion the sperm loses its tail and becomes a rounded body, then termed the male pronucleus. Gradually it penetrates more and more deeply into the female germ-cell, until it unites with the female pronucleus to form a combined or segmentation nucleus. Fertilisation is then complete, and the cell thus formed is the first stage in the development of a new unicellular embryo, totally unlike the parents from which it springs, or the individual into which it will develop.

Cross-fertilisation is evidently one of the latest products of evolution, since it is the usual method of fertilising in the highest plants and animals. It must, therefore, have some very important function. It is thought that one of the objects of cross-fertilisation is to secure the production of vigorous offspring, and Darwin found in the case of some plants which usually reproduce by cross-fertilisation that if self-fertilisation was artificially produced the resulting offspring were feeble. Nevertheless, both plants and animals which normally reproduce by parthenogenesis produce healthy offspring. It would appear, therefore, that cross-fertilisation is essential for the continued vigour of a species in which that process is normal. *See* Biology; Embryology; Eugenics; consult also *The Flower* and the Bee, John H. Lovell, 1919; *Problems of Fertilization*, F. Rattray Lillie, 1919.

**Fertiliser.** Chemical substitute for animal manures. It is used to restore to the soil various elements and ingredients abstracted from it by plants in the course of cultivation. Fertilisers are easily procured, cleanly to handle, and less likely to introduce insect pests than the old-fashioned stable manure. For flower gardens proprietary complete fertilisers, the bases of most of which consist of dried blood and ground bones, may



**Count von Fersen,**  
Swedish soldier

be safely used according to directions, but for vegetables, in particular, three chief food ingredients have to be applied directly to crops in the form of manure. These are nitrogen, phosphates, and potash. The presence of lime, also, is necessary, not so much as a plant food as on account of its action on the soil. The best and most economical application of chemical fertilisers to vegetable crops is summarised below.

For potatoes use sulphate of ammonia,  $\frac{1}{2}$  oz. per sq. yd., just before the first earthing up. Superphosphate of lime, or superphosphate and steamed bone flour mixed in equal proportions, may be applied when planting, at the rate of  $1\frac{1}{2}$  oz. per sq. yd. For the cabbage for family use sulphate of ammonia,  $\frac{1}{2}$  oz. to  $\frac{3}{4}$  oz. per sq. yd. before the first earthing up or as soon as growth starts, and superphosphates at the rate of 1 oz. per sq. yd. On very light soils, salt at the rate of 1 oz. per sq. yd. will help. The pea and bean family require a mixture of superphosphate and steamed bone flour in equal proportions applied to the ground before or after sowing the seed, at the rate of 1 oz. to 4 yds. of drill. The mixture must not come into direct contact with the seed.

Onions, leeks, and celery require sulphate of ammonia,  $\frac{1}{2}$  oz. per sq. yd., superphosphate and steamed bone flour, 1 oz. per sq. yd., and, on light soils, 1 oz. of salt per sq. yd., all in the early stages of growth. For carrots, parsnips, and beet, use sulphate of ammonia,  $\frac{1}{2}$  oz. per sq. yd., after thinning out or singling, and superphosphate, salt, etc., as for onions. For lettuces, spinach, and radishes, use sulphate of ammonia and superphosphate as above. Where the soil is known to be overstocked with organic matter, containing nitrogen, producing a very rank growth of leaf, the sulphate of ammonia should be withheld.

Where potash salts are unobtainable, wood ashes which contain potash should be collected and applied at the rate of 1 oz. per sq. yd. Ashes must be collected as soon as possible after burning, as rain quickly washes out the potash. On heavy soils, those rich in organic matter, basic slag may replace superphosphate, particularly in districts with a good rainfall. The quantity used should be from one and a half times to twice as much as is recommended in the case of superphosphate.

During the Great War the problem of fertilisers became acute in all countries. In Great Britain the utilisation of by-products from

munitions making and other manufacturing industries partially relieved the situation. A commission recommended the utilisation of the excess production of sulphuric acid in the manufacture of superphosphates. Both France and Italy suffered seriously, the latter country only securing 16 p.c. of the normal supply of phosphate. Germany took steps to increase her production of fertiliser nitrogen, phosphoric acid and potash, her total production rising from 220,000 tons in 1917-18, to 520,000 tons in 1918-19. She also developed the production of synthetic nitrogen compounds. See Crops; Manure.

**Ferule** (Lat. *ferula*, fennel, cane, *ferire*, to strike). Instrument of punishment. The stalk of the giant fennel, *Ferula communis*, was used as a rod or cane, to which it gave its name. The word is applied also to a sole-shaped strap, comparable to the Scotch tawse, with which boys are beaten on the palms of the hands in some schools.

**Fescennine Verses.** Improvisations in dialogue form made at rustic gatherings in ancient Italy, the origin probably of the native Roman *satura*, or satire, in which the speakers made capital out of the faults and follies of their neighbours. As a feature of wedding celebrations they were commonly characterised by broad licentiousness. Hence the derivation of the name from the Lat. *fascinum*, a phallic emblem, by some etymologists who deprecate its other derivation from Fescennia on the ground that the custom was widespread throughout Italy, and not peculiar to that small Etruscan town. From the Fescennine verses the epithalamium, or nuptial song, was ultimately developed, a literary form of which Catullus, for one, made exquisite use, and which has been successfully reproduced in the literature of many countries, notably by Herrick in England.

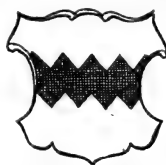
**Fesch**, JOSEPH (1763-1839). French cardinal. Born at Ajaccio, Jan. 3, 1763, the step-brother of Letizia Bonaparte, he was archdeacon of Ajaccio until the French revolution, when he retired. He had always befriended the Bonaparte family, and in 1802 Napoleon made him archbishop of Lyons, and procured for him a cardinal's hat. Ambassador at Rome in 1804, he persuaded Pius VII to crown Napoleon in Paris, and was made grand almoner and senator of the Empire. His position as intermediary between Napoleon and Pius was extremely difficult during the years 1806-7, and Fesch's relations with both became strained, especially after the Gallican council

of 1811, from the presidency of which the emperor dismissed his uncle. Retiring to Rome on the fall of the Empire in 1814, he returned to Lyons during the Hundred Days, but after Napoleon's abdication he once more went to Rome, where he died, May 13, 1839.

### Fescue Grass

(*Festuca*). Extensive genus of grasses. Of the natural order Gramineae, they are natives of cold and temperate regions. The flattened flower spikelets are grouped in panicles or racemes; there being three or more flowers in each spikelet. Many of the species are among the most valuable of meadow and pasture grasses, being rich in saccharine matter. Sheep's fescue (*F. ovina*), with bristle-like leaves, meadow fescue (*F. pratensis*), and hard fescue (*F. duriuscula*) are most useful for this purpose.

**Fess** (Lat. *fascia*, band). In heraldry, a horizontal band carried across the middle of the shield



Fess in heraldry

and occupying one-third of the field. It is one of the ordinaries (*q.v.*). The middle of the field is known as the Fess Point. A shield or charge divided by a horizontal line in the middle is said to be "per fess"; but if it is divided into any number of horizontal bands above four, it is called "barry." If there are three divisions it is "tierced" or "tiercy per fess"; if four, "quartered per fess." Charges placed in horizontal rows are termed "in fess."

**Festiniog** or **FESTINIOG**. Urban dist. and town of Merionethshire, Wales. It is 16 m. N. of Dolgelly, and stands amid the hills, surrounded by beautiful scenery, one feature of which is the Cynfael Falls. A narrow gauge rly. runs to Portmadoc. The place is also



Fescue Grass, *Festuca pratensis*

served by the G.W. R. The main industry is the large slate quarries, which employ most of the male inhabitants. Pop. 9,674.

**Festival** (Lat. *festivus*, joyful). Days on which some deity or person was honoured or the memory of some important event kept with certain solemnities, ordinary work being as a rule suspended. Such festivals or feasts no doubt were originally nature festivals, connected with its changing phenomena, its decay in winter and renaissance in spring (see Adonis). They were partly merrymakings and thanksgivings for benefits received, partly prayers for benefits to come, and partly ceremonies to appease the anger of the gods for sins committed, though even from the latter the festive element was not absent.

The Greek festivals were held in honour of national heroes; of gods connected with the fruits of the field, such as the Dionysia, Lenaea, and Eleusinia; and of the tutelary deities of Athens, such as the Panathenaea. The four great games—Isthmian, Nemean, Olympian, and Pythian—set the seal on the national unity. At Rome each family kept the festival of its domestic gods, the Lares and Penates; the public festivals were under the control of the state—festivals in honour of the tutelary deities of Rome, Romulus, Mars, and Quirinus, and of the divinities who presided over the crops, the fields, and boundaries, such as the Cerealia, Lupercalia, Saturnalia, and Terminalia. The public games (*ludi*) were also national festivals. (See Feriae; Ludi.)

#### Religious Festivals

Religious festivals are days set apart for rest, thanksgiving, and special observance. Some are fixed, as Christmas; others movable, as Easter. In the Christian calendar the greater festivals are called red letter days; while the lesser are known as black letter days.

Among the Jews such days are regarded as days appointed by God for meetings with His children. They include Passover, or Unleavened Bread, Nisan 15-22; Pentecost, Sivan 6; Trumpets, or New Year, Tishri 1; the Day of Atonement, or Great Sabbath, observed on Tishri 10, by complete rest and fasting, the only fast not postponed by the occurrence of the Sabbath; the Tabernacles, or Ingathering of the Harvest, Tishri 15-22; Jubilee, at the end of every seven Sabbatical Years; Purim, etc.

In the Christian Church the earliest festivals were the love feasts or Agapae (*q.v.*). Confusion has been caused by disregard of

the fact that both authorship and date of festival homilies are uncertain. Until the beginning of the 4th century, record exists only of Easter and Pentecost, though as each Friday was a fast in remembrance of the Crucifixion, so each Sunday was a festival in remembrance of the Resurrection. The feast of the Nativity was observed about 300; Christmas, Epiphany, and Ascension Day were added later.

#### Saints and Martyrs

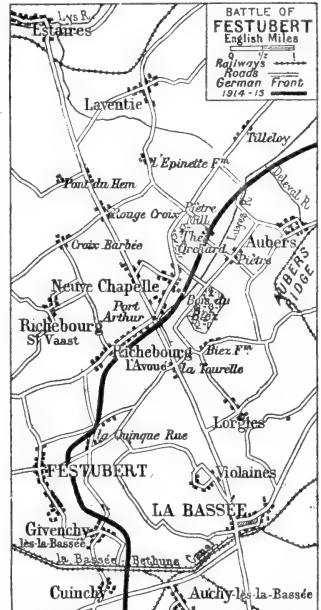
Days in memory of the Apostles were next observed, and were followed by observance of days devoted to the memory of saints, of the Purification of the Virgin Mary, the Annunciation, the nativity of S. John the Baptist, the Circumcision, the death of martyrs, the transfer of their relics or the consecration of churches dedicated to them. Many Christian festivals are of local origin, some adapted from Jewish and pagan practice, and they increased in number during the Middle Ages. In the Roman Catholic communion, feasts are divided into doubles, semi-doubles, simples, etc., according to the offices appointed for them.

Inclusive of Sundays, festivals in the Anglican calendar number 149; of these the principal have proper collects, epistles, Gospels, and lessons, and some have a proper preface at Holy Communion and proper Psalms. The movable festivals which depend upon Easter are Septuagesima, Rogation Sunday, Ascension Day, Whit Sunday, and Trinity Sunday. In Great Britain public observance of Church festivals, apart from Easter, Whitsun, and Christmas, has fallen into abeyance; formerly all were made the occasion of some difference in the ordinary daily life of the people.

#### Bairam and Ramadan

The chief festivals among Mahomedans, whose rest day is Friday, the day on which Mahomet was born, are the Feast of Bairam, that of Sacrifices, and that following the fast of Ramadan. The Hindus have their festivals, as that of Siva; and among certain tribes of North America is observed a festival called the Day of the Dead. The French Revolutionary calendar included five festival days, dedicated respectively to Virtue, Genius, Labour, Opinion, and Rewards, all in September. See Calendar; Prayer Book; articles under the name of each festival or saint; consult also Church Festivals, A. J. Maclean, in the Prayer Book Dictionary, ed. G. Harford and M. Stevenson, 1912.

**Festubert.** Village of France in the dept. of Pas-de-Calais. It is 3 m. W. by N. of La Bassée and was prominent in the Great War. There was an engagement here between the British and the Germans, Nov. 23-24, 1914. On the night of Nov. 23, 1914, the Germans had carried up a sap close to the Allied trenches, E. of Festubert, which were held by troops of the Indian corps. When day broke next morning the German infantry poured a storm of bombs



Festubert. Plan of the country over which were fought the battles of Nov., 1914, and May, 1915

and hand-grenades into the most advanced British trenches. They followed up this bombardment with an attack, and penetrated into the British trenches.

In the afternoon Sir J. Willcocks, commanding the Indian corps, ordered the original line to be recovered and held at all cost. All available British guns were directed to shell the trenches that the Germans had captured, as preparation for a British counter-attack, which was to open at 4.30. The infantry had to advance over snow-covered ground and they were received with violent machine-gun fire. But after hard and continuous hand-to-hand fighting, the ground lost was recovered.

**Festubert, BATTLE OF.** Fought during the Great War, May, 1915. In May, to assist the French operations in Artois and at Arras, where Foch was attacking, the British

First Army (Haig) was ordered to take the offensive on a front N. W. of La Bassée, from Laventie to Richebourg l'Avoué, against the German works on the Aubers Ridge. On the N. portion of this front the 4th corps (Rawlinson) attacked; on the S., the Indian corps (Willcocks) and the 1st corps. On May 9 the infantry advanced after a 40-min. bombardment, but found that the Germans were perfectly prepared, and that their wire had not been cut or their defences demolished by the artillery. The attack failed with heavy British losses. The total of killed, wounded, and missing exceeded 12,000, without any result, except that the Germans were held down in the section of attack. The failure was due to the weakness of the British artillery.

Nevertheless, French decided to resume the attack, extending it S. to Festubert. On May 15 the British once more assaulted, late in the night, after a prolonged artillery preparation. The troops engaged were the Indian corps on the British left, with the 2nd division at Givenchy and the 7th at Festubert. The Canadian division was placed in support. The 2nd division broke into the German trench system, carrying it for about half a mile, and the 7th division, attacking E. of Festubert, took another section of the German line, but between these two indentations the Germans could not be dislodged. They counter-attacked in the night of May 16, and forced back the 2nd division slightly, though most of the ground won was held. On May 17 the British, both from N. and S., assaulted the German wedge, 1,000 yds. long, between the two dents, and cleared it.

The trench battle continued on the following days; the British were much hampered by wet weather and insufficient ammunition, but ground was slowly gained, always at the price of heavy sacrifices. On May 20-21 the Canadians took up the work of the 7th division before Festubert; on May 25 the 47th London Territorial division was put in on the British right at Givenchy, and captured a section of the German line there, which was successfully held. The battle brought little result, as the capture of some thousands of yards of trenches was no compensation for the heavy sacrifices incurred. In killed, the British loss was 3,620; wounded, 17,484; missing, 4,321.

H. W. Wilson

**Festus.** Poem by Philip James Bailey (q.v.). First published in 1839, it was added to and otherwise altered during 50 years until in its

final form, 1889, it consists of about 10,000 lines. A variant of the Faust legend, illustrating the ultimate triumph of good over evil, its scenes take place in Heaven and on the earth, and though it introduces "the three Persons of the Trinity as interlocutors in its wild plot" in a way which many readers resented, it has frequent terse and happy lines which have become familiar quotations.

**Festus, PORCIUS** (d. A.D. 62). Procurator of Judaea in succession to Felix, about A.D. 58. He heard, in the presence of Herod Agrippa II and Berenice, the case of S. Paul, whom he sent to Rome for trial (Acts 24-25; Josephus's Ant. of the Jews, xx, 8; Wars, ii, 14). He is said temporarily to have suppressed the Sicarii or Assassins, and was, if cynical, inclined to justice. He is introduced in a powerful short story, The Procurator of Judaea, by Anatole France.

**Festus, SEXTUS POMPEIUS** (3rd century A.D.). Latin grammarian. He was the author of an abstract of the important work by Marcus Verrius Flaccus, On the Meaning of Words, containing an alphabetical list of obsolete words, together with valuable information concerning old state institutions and ceremonial. Part of it (M-T) has been preserved in the abstract of Festus and a further epitome by Paulus Diaconus (8th century), which is complete.

**Feth Ali Shah** OR **BABA KHAN** (1762-1834). Shah of Persia. Nephew of Aga Mohammed, he came to the throne in 1798, and threw himself into a contest with Russia to recover Persia's lost Caucasian territories. This brought him into conflict with Britain in 1812, and by the treaty of Gulistan, 1813, Feth Ali was forced to cede Georgia and seven adjacent provinces to Russia. War with Turkey



Fetichism. 1. Bondu witches or devils from Sierra Leone. 2. Man of Angola worshipping two fetiches. 3. Natives of the Sierra Leone hinterland with their fetich

followed, 1821-23, but neither side gained material advantage. He died at Ispahan, Oct. 20, 1834.

**Fetishism** (Lat. *factitius*, artificial). Belief that the services of a spirit may be appropriated by the possession of its material embodiment. The 15th century Portuguese navigators applied to the sacred objects of the W. African negroes the term *feitiço*, a variant of the English "factitious," which they used of their own amulets. There is, however, a radical distinction between a fetish, which is a subservient spirit in its shrine, and an amulet, which—as in a modern mascot—is merely an instrument of spirit service. So also a fetish is not a god or even a divine image, and fetishism is not idolatry. The term has been used variously and confusingly, but as defined above it conveniently describes a phase of the magico-religious life of negro Africa, and an analogous though not identical one of that of aboriginal America.

The fetish spirit may be bodiless or a disembodied soul; it may reside in a shell or a tooth, a hoof or a horn, a bead or a rag. The choice of an object as a fetish is often determined by its unusualness; the Mendi people consecrate to the same use rude soapstone statuettes (British Museum) found in caves abandoned by an earlier race.

#### Stock-and-Stone Worship

In the heart of Africa there is a tendency to turn a shapeless stone or a post—by a dab of paint or by rough chiselling—into human semblance. This belongs to a widespread stock-and-stone worship that in some senses is transitional between fetishism and idolatry. But the fetish is treated as a genie or guardian spirit, rather than as a superior. It is consulted or implored, praised or reproached, treasured or discarded. Its special "medicine" is discovered by experiment; the strings of *wongs* hung about the neck, over the hut door, at the village entry, have their several potencies, bestowing health or success, children or rain.

Among the American Indians, spirit-possessed objects are employed in an analogous way, and are called fetishes by American ethnologists. With the Zuni, objects bearing or made to bear an animal semblance are highly prized, especially when consecrated by long tribal tradition. Here, however, a totemic aspect is observable; both in N. America and elsewhere objects once classed as fetishes are now perceived to be totems. The Amerind fetish usually differs from the African in

possessing, instead of a spirit, an impersonal power which the Iroquois call *orenda* and the Algonquins *manito*. See Totemism.

**Fetter Lane.** London thoroughfare linking Fleet Street with Holborn. First mentioned in 1612 and once a way leading to gardens, its name is variously derived from *failours*, vagabonds; and *feutriers*, felt-makers. The town hostels of the bishops of Norwich was once here. On the W. side is an entrance to Clifford's Inn (*q.v.*), with the Record Office and Breems Buildings, containing Birkbeck College, beyond. On the E. is a Moravian chapel, rebuilt 1748, where Richard Baxter, Wesley, and Whitefield preached. Nevill's Court has old houses, and in Fleur-de-Lis Court, the scene of Mrs. Brownrigg's murder of her apprentice, Mary Clifford, in 1767, is Newton Hall, for long a Positivist meeting-place. The White Horse, an old coaching inn, stood at the Holborn end.

**Fettes College.** Scottish public school. Founded by money left by Sir William Fettes (1750-1836), lord provost of Edinburgh, it was opened in 1870, on a site near

stance is the feud between the Guelphs and Ghibellines, and there are instances among the Scottish clans, *e.g.* between the Campbells and the Macdonalds. See Vendetta.

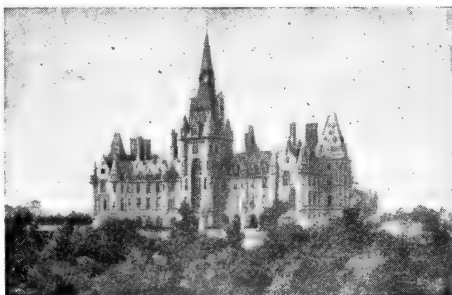
**Feudalism** (late Lat. *feudum*, A.S. *feoh*, cattle, property). Name given to the social and political structure or organization which grew up on the ruins of the Imperial Roman system in Western Europe during the early Middle Ages. Universally established in its main features by the end of the 11th century, on its political side, it was by the 16th century yielding to the effective concentration of the sovereign authority in the hands of supreme central governments.

It was based upon tenure of land. According to the lawyers, every foot of soil was actually the property of the king. Estates had been granted by him to his servants upon recognized conditions. On those conditions the king's "men," "barons," "tenants-in-chief," "vassals," held their lands from their overlord the king. They in their turn had granted portions of their estates upon like conditions to their own men or vassals. At the bottom of the scale

came the actual occupants of the soil, who also held their plots of land upon conditions, from their immediate overlord, whoever he might be. Except the king, every holder of land was the vassal of someone, whether his immediate overlord was the king himself, or a baron holding from the king, or a vassal

holding from a baron, or a vassal of a vassal.

The primary condition of holding land was the rendering of military service to the immediate overlord; at the bottom of the scale agricultural or other kinds of service took the place of military service. The vassal rendered homage to his overlord, taking the oath of allegiance and service to him as his man, the lord taking corresponding oath to be "true lord and protector" to his man, the whole system being based upon the recognition of mutual obligations. Further, since the small landholder was not strong enough to protect himself against a powerful neighbour, and could only with great difficulty appeal to a distant overlord for protection, it was customary for the small men to "commend" themselves to the



Fettes College, Edinburgh. Buildings seen from the south

J. C. Inglis

Inverleith Park, Edinburgh. It is now governed under a scheme dating from 1886. It possesses a



Fettes College arms

for about 250 boys.

**Fetting.** Engineering term used to describe the lining of the hearth of a puddling furnace. It is usually sand or cinders, or a mixture of ore. See Furnace.

**Feud.** Word meaning a state of animosity, generally between two parties. It carries the idea of continuous hostility. A notable in-



powerful—that is, to surrender their land (since it was alienable) to a lord, from whom they received it back as his tenants or vassals. Custom established the right of hereditary succession in various forms, and the claims a lord was entitled to make upon his tenants.

Broadly speaking, on the continent of Europe, it was generally held that the vassal owed allegiance only to his immediate lord, the result being that the king's great vassals, dukes or counts, could, if they chose to resist him, call upon their own vassals to serve against the king; the royal power depended in effect on the loyalty of the great vassals who individually, or by combination, were strong enough to defy him. Thus when a duke of Aquitaine, a vassal of the French crown in respect of Aquitaine, happened also to be king of England in respect of which he was independent of the French crown, he was able singly to defy his overlord; so also when one person was at once duke of Aquitaine, duke of Normandy, and count of Anjou.

In England the feudal system was not accompanied by an equal danger, because until the 15th century no single feudatories held sufficiently extensive domains to be strong enough to defy the crown except by means of widespread combination. Also, in England, the doctrine prevailed from the first that allegiance to the overlord prevailed over allegiance to the immediate lord. The last remaining relics of feudalism were abolished by the Law of Property Act, 1922. See Manor; Villeinage; consult also Constitutional History of England, W. Stubbs, 1897.

**Feu de Joie** (Fr., joy-fire). Running fire of musketry used generally on occasions of rejoicing. Ranks of soldiers fire one after another, beginning on the right of the front rank and continuing from the left of the second rank, etc.

**Feuerbach, Ludwig** (1804–72). German philosopher. Born at Landshut, Bavaria, July 28, 1804,



Ludwig Feuerbach, German philosopher

he attended Hegel's lectures at Berlin, and became a tutor at Erlangen. He abandoned teaching for a literary career in consequence of the excitement caused by his Thoughts

on Death and Immortality (published anonymously 1830), in which he denied the im-

mortality of man. Subsequently inclining towards atheism, he declared the reconciliation of faith and science to be impossible, and in the place of theology substituted anthropology. The body is the very essence of man; the idea of a superhuman power is a fiction of man's own imagination. Man is only what he eats. Sensuous enjoyment is the supreme good, but only attainable by man as a member of society. He died near Nuremberg, Sept. 13, 1872. His other works include *The Essence of Christianity*, 1841, Eng. trans. M. Evans, 1854; and *The Philosophy of the Future*, 1843.

**Feuillants.** Religious order that flourished in France from the 16th century. It was an offshoot of the Cistercians, and the name originated in their monastery at Feuillant, near Toulouse. The abbot there, Jean de la Barrière, got into trouble with the authorities, so with a following he migrated to Paris in 1587, and founded the new order, one adopting a stricter form of life. A home was given to them in Paris by Henry III, and in 1589 they were recognized formally by the Pope. A later pope divided the order into two branches, French and Italian. The French kept the original name, and at the Revolution had in France 24 monastic houses, including one in the Rue St. Honoré, Paris.

**Feuillants.** Name of one of the parties that sprang up during the French Revolution. It was given to the members of a club because they met in the building in Paris formerly occupied by the religious order bearing this name. They originated with some Jacobins who, in 1791, refused to ask for the deposition of Louis XVI, and thereafter they formed the moderate wing of the revolutionary party.

They wished to maintain the constitution and to set up a stable government, and at the outset they called themselves the Society of Friends of the Constitution, but they never secured any great amount of support from the populace, although they were the largest party in the Constituent Assembly. Sieyès, Barère, and Lafayette were perhaps the most prominent members. Their wealth and their conservatism brought them under the suspicion of the extremists, and, after the rising of Aug. 10, 1792, their names were published as enemies of France. This put an end to their activities, although the name was still used to describe men holding moderate opinions.

**Feuillet, OCTAVE** (1821–90). French novelist and dramatist. Born at St. Lô, in La Manche, Aug.

11, 1821, he became an assistant to Dumas the elder. When he started on independent work he soon achieved considerable popularity with plays and with the novel, *Le Roman d'un Jeune Homme Pauvre*, 1858; this was followed by the



Octave Feuillet

mystical romance *Histoire de Sybille*, 1863. In 1862 he was elected to the Academy, and was later made librarian at Fontainebleau. *Monsieur de Camors*, 1867; and *Le Journal d'une Femme*, 1878, were the more notable of his later works. His stories are characterised by a blend of romanticism and realism. He died in Paris, Dec. 29, 1890.

**Feuilleton** (Fr., leaflet). French word for the part of a newspaper, usually the lower part of a page, devoted to gossip, literary, artistic or dramatic criticism, and especially serial fiction. The practice, though not the name, has been traced to the section in Defoe's *Review* headed *Mercure Scandale*, but the *feuilleton*, as at present understood, originated in the *Journal des Débats* in the early years of the 19th century.

**Fever** (Lat. *febris*). Condition of the body, the most characteristic feature of which is a rise of temperature. Accompanying symptoms are increase in the pulse-rate, headache, thirst, and, in the early stages, sensations of chilliness which in severe cases may amount to fits of acute shivering or rigors. The skin is usually dry at first, but later there is profuse sweating, and the skin is hot and flushed. The urine may be diminished in amount and is highly coloured. The tongue is often coated, and in children vomiting is frequent. The normal temperature of the body in health varies between 98° and 99° F. Up to 102° F. the fever may be spoken of as "moderate." Temperatures of 105° or 106° are high, and above 106° the term *hyperpyrexia* may be employed. A temperature of 107° F. is very grave and recovery is improbable.

The cause of fever is most often the circulation of a poison in the blood, and in most cases the poison is a product of bacterial activity in an acute infectious disease. It is now recognized that the rise of temperature indicates the reaction of the body against the poison in the blood, and, provided it does

not reach a dangerous height, it is to be regarded as a beneficial process. The treatment of fever depends upon the disease with which it is associated. Dangerously high temperatures may be reduced by cold sponging, or the application of an ice-pack.

Certain clinical terms are used to describe various types of fever. Continued fever is the condition in which the fever remains persistently high; in remittent fever there are daily fluctuations of two degrees or more; and in intermittent fever the increased temperature is only present during part of the day. In malaria, when there is a daily rise of temperature, the condition is termed quotidian; when the rise occurs on alternate days it is said to be tertian; and when two days elapse between the paroxysms it is quartan. See Scarlet Fever.

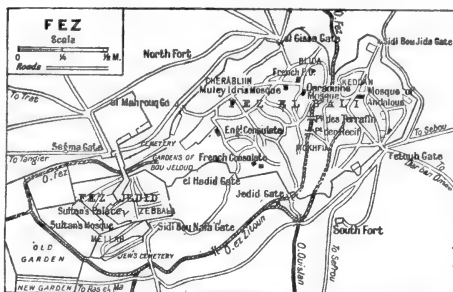
**Feverfew** (*Matricaria parthenium*). Perennial herb of the natural order Compositae. A native of Mid and South Europe, it has small, clustered, daisy-like, yellow-



**Feverfew.** Plant and flower of the medicinal herb

centred, white flower-heads. The leaves are deeply cut into toothed oblong segments. The whole plant has a bitter, tonic smell, and was used as a rustic medicine in slight fevers. The name, formerly spelt feverfuge, is derived from Lat. *febrifugia* (*febris*, fever; *fugare*, to drive away).

**Fever Hospital.** Hospital for the reception of patients suffering from infectious diseases, *e.g.* scarlet fever and diphtheria. Such a hospital should be built on a site with a dry subsoil and good fall for drainage. It should be, where possible, outside the town which it serves but with good facilities for access, and there should be ample grounds around the hospital. There should be a detached administrative, block, separate wards for patients suffering from different diseases, and out-buildings, such as laundry, stores, mortuary, and disinfecting chamber.



In the wards of hospitals the minimum floor space should not be less than 144 sq. ft., and the minimum cubic space 2,000 cubic ft. per head, the system of ventilation providing that this is changed three or four times an hour. Where space permits the system of one-storeyed pavilions is the best, as they can be connected with corridors open to the hospitals for smaller pavilions, and larger space for convalescent hospitals for diseases, and should be close to any population. See Hospital.

**FEVERSHAM, EARL OF.** British title borne by the family of Duncombe since 1868. Charles Duncombe (1764-1841) was a descendant of Thomas and Ursula Browne, who, on inheriting the wealth of Ursula's brother, the London banker, Sir Charles Duncombe (d. 1711), took his name. In 1776 Charles Duncombe was made Baron Feversham. His grandson William, the 3rd baron (1829-1915), was made an earl in 1868. His grandson, who succeeded to the title, was, as Viscount Helmsley, Unionist M.P., 1906-15. In 1916, during the Great War, he was killed in action and his son Charles became the 3rd earl. The family seat is Duncombe Park, Helmsley, Yorks.

**Feyjoó, Benito** (1676-1764). Spanish poet and monk. Born Oct. 18, 1676, of good family, he entered the Church in his youth. Of a studious disposition, he devoted himself to scientific pursuits, and the art of healing. Most of his life was spent in a monastery at Oviedo, where he died, Sept. 26, 1764. In his Teatro Critico (Critical Theatre) 1751-59, Feyjoó indicts the metaphysical views of his

compatriots. He was a champion of woman, and advocated a higher position for her 'in the community. He was attacked by several writers, and called before the Inquisition, which, however, he refused to attend. *Pron.* Fâ-ee-ho.



Fez. A street scene in the old part of the city. Above, plan showing position of the principal buildings

**Fez** OR **TARBUSH**. Close-fitting cap of felt with a flat top, usually red with a black tassel. It is worn chiefly by the Turks with or instead of a turban (*q.v.*). The name comes from Fez, in Morocco, where these caps were originally made. See colour plate, Caps.

**Fez** or **Faz.** City of Morocco, and the northern capital. It is situated in a valley about 100 m. E. of the port of Rabat (*q.v.*), and is one of the sacred cities of Islam. The city, surrounded by ancient walls, is picturesque, and contains the Mosque of the Cherubim or of Muley Edris, to which is attached a Mahomedan university, once the centre of learning in N.W. Africa, with a library containing some 30,000 MSS. The city, which was founded in A.D. 808, is connected with Rabat by a light railway opened Feb. 8, 1915. Pop. 105,855.

**Fezzan.** Country occupying the S. portion of the Italian colony of Libya (Tripolitania) and politically attached to it. It was occupied by Italian troops towards the end of 1913. Fezzan extends some 400 m. N. and S., and 300 m. E. and W., and belongs to the desert region of N. Africa. The inhabitants, who are Mahomedans belonging to the Sunnite sect, are estimated to number about 70,000. The chief oases are Ghat in the extreme S.W., and Murzuk.

**F.F.A.** Abbrev. for Fellow of the Faculty of Actuaries.

**Ffestiniog Group.** Series of grey flagstones belonging to the Cambrian system of sedimentary rocks, developed in Merioneth. It is characterised by abundant fossil remains of a small brachiopod (*Lingulella davisi*), and has persistent upper beds crowded with remains of *Lingula*. It was deposited under shallow water.

**Fiacre** (Fr.). Name of a saint and of a hackney carriage. The saint, also known as S. Fiachrach, a native of Ireland, died at Breuil, near Paris, about 670, and is commemorated on Aug. 30. Outside the Hôtel de S. Fiacre, in Paris, in the 17th century, was the first stand for hackney carriages, and hence, it is supposed, is derived the application of the name *fiacre* to the vehicle. See Cab.

**Fians** or **FIANNA**. In Celtic tradition, the band of warriors led at the height of their power by Finn (*q.v.*). Opinions differ widely as to their original nature, but they are generally believed to have flourished about the middle of the 3rd century. They existed in the time of Finn's father, Cumhal, and formed a militia force of specially chosen fighting men to expel foreign invaders from Ireland. The Gaelic legends of Ireland and Scotland have much to tell of their exploits in war and love and hunting, and in some, the Fians appear as a knightly order similar to that of the Round Table. Numerous cairns, standing-stones, etc., all over Ireland and in some parts of the Scottish highlands are associated with them.

Their strength, however, grew dangerous, and in their last great battle at Gabra (283) they were broken by Coirpre, son of Cormac. The anglicised form, Fenians, gave title to the Fenian Brotherhood. See Fenianism; consult also The Dean of Lismore's Book, ed. with trans. T. MacLauchlan, 1862; Leabhar na Feine, J. F. Campbell, 1872; The Fians, ed. J. G. Campbell, 1891; Bards of the Gael and Gall, G. Sigerson, 1897; Ossian and the Ossianic Literature, A. Nutt, 1899; Myths and Legends of the Celtic Race, T. W. H. Rolleston, 1911.

**Fiar.** In Scots law, name given to the ultimate owner of an estate, the one in whom the ownership is really vested. The *fiar* is, therefore, the opposite of the tenant for life.

**Fiars Price.** Price of grain in Scotland as fixed by the sheriff of the county, sometimes with the aid of a jury. It is done for each county each year, the object being to set up a standard in order that the cash value of certain payments, formerly made in kind, can be

calculated. Among these are certain clerical and other incomes derived from tenants, and in some cases rents. The practice, which is very old, was regularised by an Act of 1723.

**Fiat** (Lat., let it be done). Term used in English law for an order that does not need to be drawn up formally. Fiats are issued by judges and other high officials under certain conditions and according to certain rules.

**Fibre** (Lat. *fibra*, filament). Term used for threadlike construction or appearance of many substances. Hair, wool, silk threads of the cocoons of silkworms, parts of leaves, bark of certain trees, grasses, etc., are all fibres. Though under certain conditions some metals exhibit a fibrous construction, it is difficult to separate the fibres, but occasionally metals spun into fine threads are spoken of as metal fibres, as also is spun glass. With the exception of asbestos, the fibres of which are woven into a kind of cloth, the fibres of commerce can be conveniently divided into two classes, animal and vegetable.

Animal fibres are the wool and hair of animals, and the silk of insect cocoons. Though comparatively few animals produce commercial fibre, these few are of great importance. Sheep's wool, mohair from the Angora goat, the hair of the llama and alpaca, and those of the cow, camel, and rabbit—the latter for felts—and horsehair are the chief commercial animal fibres, and their uses are dealt with under their respective headings.

Vegetable fibres constitute a large and important class, and are put to a greater variety of uses than animal fibres. Flax, China grass or ramie, hemp, jute, cotton, raffia, sisal hemp, tampico, coconut, esparto grass, and Mexican whisk or broom root are among the chief vegetable fibres.

The grasses or fibres of S. America and Africa are collected and sent over to importers in the British Isles, who sell them to the dressers, who in turn cut the fibre to different lengths for various uses and sell it to brush-makers. Brush-making is an important industry, and an enormous amount of fibre is used, so that some brush-makers dress and clean their own raw material. The fibre is cleaned of all dirt, cut, and hackled to make it clean and strong; then cut again, dyed if necessary, steamed and so made straight, and then it is left to dry hard.

Palmyra fibre, commonly known as bassin in the brush trade, is a strong, medium-sized fibre, and is

very often dyed to look like Bahia piassava, which is the best fibre for street brushes, etc. Mexican fibre, of which there are two kinds—tula, which is short, and jumava, a longer variety—is a white fibre which, when dressed, is used for toilet hair brushes, nail brushes, etc. Coco fibre from the husk of the coconut is used for making mats, and also for the large brushes and brooms which are used for domestic purposes.

The principal use of coir yarn is for thatching, though it is sometimes used for large mats. Piassava, the most important fibre in the brush trade, is used for all kinds of brushes and brooms, and is found chiefly in Brazil and W. Africa. It is also largely used in S. America for rope-making. Kitool, from Ceylon, is the aristocrat of fibres, being polished and treated with oil, making it very expensive. It is used for making fine brushes and also for the manufacture of ropes of good quality in India.

Such brushes as dandy brushes for horses are generally made from Mexican fibre. Animal fibre, as horsehair, badger's hair, sable, and camel's hair, are also extensively used in brush-making. Fibres, chiefly of the cheap kinds, which pulp easily, are used for paper-making. Among them are esparto grass, the paper mulberry—the bark of which is converted into paper extensively used in Japan—cotton grass, and Deccan hemp. From the leaves of *Carludovica palmata* is obtained the fibre from which Panama hats are manufactured; from *Cibotium barometz*, a fern growing in the Sandwich Islands, comes a variety of vegetable silk used for stuffing upholstery work, especially in the U.S.; and from *Eriodendron anfractuosum* comes kapok, a soft, silky, elastic fibre used in upholstery, for the stuffing of cushions, seats, etc. See Asbestos; Cotton; Flax; Hemp; Jute; Paper; Rope; Silk.

**Fibrin** (Lat. *fibra*, filament). Threads of solid proteid formed in the process of coagulation of blood. The fine threads entangle the corpuscles of the blood and, gradually shrinking, squeeze out the fluid part of the blood or *plasma*, the solid mass of fibrin and corpuscles forming the clot. See Blood.

**Fibroid.** Tumour composed mainly of fibrous tissue, more correctly called fibroma (*q.v.*). A common tumour of the uterus is spoken of as a fibroid, but is really developed from the muscular tissue. See Uterus.

**Fibrolite.** Variety of mineral sillimanite (*q.v.*), one of the andalusite group. Chemically a silicate

of aluminium, it occurs in crystalline schists in form of lenticular lumps consisting of finely fibrous aggregates.

**Fibroma.** Tumour composed mainly of fibrous tissue. Soft fibromata most frequently develop from the connective tissue of the skin, and may form pedunculated outgrowths. Hard fibromata are found in connexion with the periosteum or tissue covering the surface bones, the ear, and other parts.

**Fibrositis.** Disease of an inflammatory nature affecting the fibrous tissue or fascia which surrounds muscles and extends between the muscular fibres. Pain is the most prominent symptom. The causes of the disorder are exposure to cold and wet, sudden chilling after heavy labour, and sometimes a blow. Persons of gouty tendency are most likely to be affected. See Lumbago; Pleurodynia; Stiff Neck.

**Fibrous Tissue.** Tissue composed chiefly of bundles of fine white fibres. It is found in tendons, ligaments, fascia, and the deeper layers of the skin.

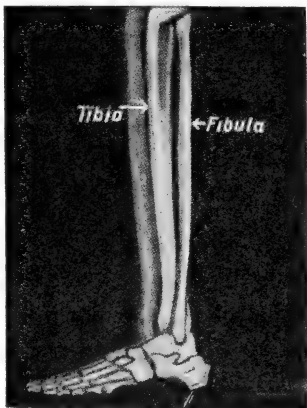
**Fibula** (Lat., buckle). Outer of the two bones which form the skeleton of the lower leg. It is a long, slender bone, firmly attached to the tibia by ligaments at its upper and lower extremities. The lower extremity forms the external malleolus or bony protuberance on the outer side of the ankle, and helps to form the socket in which the foot articulates with the bones of the leg. See Leg.

**Fibula** (Lat.). Brooch or clasp, especially of the early metallic ages. The neolithic bone pin, often made from the splint bone or fibula of a vertebrate animal, was imitated in bronze; when bent over until the looped head clasped the point the safety-pin resulted. Common in Italian pile-dwellings, and the early Aegean, it developed at Hallstatt a bolder bow, often much decorated. Under

La Tène influence three further stages are traced, the catchplate being bent back so as to (i) approach, (ii) clasp, (iii) unite with the bow. This sequence serves to date iron-age antiquities wherever these types are found. Unlike these late-Celtic forms, the Roman fibula

was in two pieces. Anglo-Saxon types, sometimes betraying continental influence, mostly display native developments, especially in *cloisonné*. The choicest Gaelic examples came from Hunterston, Tara, and Aesica. They are now in Edinburgh, Dublin, and Newcastle respectively. See Brooch.

**Fichte**, JOHANN GOTTLIEB (1762-1814). German philosopher. Born at Rammenau, Lusatia, May 19, 1762, he left Germany owing to poverty, for Switzerland, where he became acquainted with Kant's philosophy. The attention attracted by his *A Critique of All Revelation*, written while he was a tutor at Königsberg, helped him



Fibula. Diagram illustrating relative positions of tibia and fibula in the human leg.

to obtain the professorship of philosophy at Jena. In 1799, having been accused of atheism, he resigned his post and retired to Berlin, where he was allowed to lecture on philosophy. In 1807, when the French invaded Prussia, Fichte showed his ardent patriotism in his *Addresses to the German Nation*.



He died at Berlin, Jan. 27, 1814, from a fever contracted during the war of independence.

Fichte's system has been

*Johann Gottlieb Fichte*  
After Büry

called practical idealism, according to which the power of the will in the Ego is supreme. The Ego or self is a purely active being, which derives from itself the entirety of knowledge. It is to the Ego that we have to look for the explanation of everything. The Ego, feeling itself limited,

"posits itself" as determining the non-Ego. The counterpart of whatever belongs to the Ego belongs to the non-Ego. The Ego created the non-Ego; it creates nature and God. But God is not merely a creation of the Ego, but the absolute Ego, the infinite will of the universe, the source of the finite Ego, to which we must ever strive to become united. Fichte's most important work is *The Foundation of the Whole Doctrine of Knowledge*, 1795.

**Fichtelgebirge.** Mountain system of Germany. Its central nucleus is situated in N.E. Bavaria between the basins of the Regnitz and the Naad. The name is derived from the pine trees (*Fichte*), with which it was formerly covered. It forms a watershed between the sources of the Elbe, Rhine, and Danube. The principal summits are Skneeburg (3,461 ft.) and Ochsenkopf (3,334 ft.). It has connections with or ramifications into the Erzgebirge and the Thuringian Forest, and stretches in a south-westerly direction to the banks of the Altmühl, near Eichstadt.

**Fiction** (Lat. *fictio*, feigning). Term now applied almost wholly to prose romances or novels, although strictly it means anything that is feigned, and is applicable to any literary productions of the imagination. See Literature; Novel; Romance.

**Fiction, LEGAL.** Legal phrase denoting an assumption of fact without question of its truth, for the purpose of evading technical difficulties. Fictions occur in every system of jurisprudence. They have been invented to enable changes to be effected in the substance of the law while deferring to the wholesome imaginative reverence for its old symbols and formalities. Fictions of law are not allowed to be denied, their proper operation, according to Blackstone, being "to prevent a mischief, or remedy an inconvenience, that might result from the general rule of law," while further the maxim is invariably observed that no fiction shall extend to work an injury.

In England it was through fictions that the courts of king's bench, exchequer, and common pleas encroached on the previously distinct jurisdiction of one another. By the common law no mere civil action could be prosecuted in the king's bench, but plea of any civil action could be held there, other than actions real, if the defendant was an officer of the court, or in the custody of the marshal of the court, for a breach of the peace or any other offence; hence the fiction was introduced into the



Fibula. Merovingian bronze-gilt brooch set with garnets, 7th cent.

pleadings that the defendant had been arrested for a supposed trespass, and so, being in the custody of the marshal, could be proceeded against for any other personal injury.

Similarly in the court of exchequer, personal actions were gradually admitted by the fiction that the plaintiff was the king's debtor, and was prevented from discharging his liability by the failure of the defendant to pay. By another fiction, actions for ejectment were made to serve the purpose of claimants to land, the names John Doe and Richard Roe (*q.v.*) being employed as those of an imaginary lessee and wrongful ejector.

Other fictions impose a conventional rule where exact facts are difficult to be ascertained, *e.g.* the law takes no notice of fractions of a day, so that if a thing is to be done on a certain day, as payment of rent on quarter day, the whole day is allowed for its performance. Again, an infant becomes 21 the day before his 21st birthday, because on that day he completes 21 years of existence; but because it would be highly inconvenient to ascertain the precise moment of his birth, he becomes 21 legally on the first moment of that day.

Fictions tend to disappear by legislation. Surviving examples that may be cited are found in the lord mayor's court, London, where the plaintiff always avers that the defendant promised him in the parish of S. Helen's, so as to bring the matter within the city jurisdiction. See Jurisprudence; Law.

**Fid. Def.** Abbrev. for *fidei defensor*, defender of the faith (*q.v.*), a title of the British sovereign.

**Fiddle.** Old English name for the violin and its ancestors. Generically, it denoted sometimes any stringed instrument played with a bow, but latterly the word was applied chiefly to the smaller sizes of such instruments. The etymology is doubtful, but fiddle, with viol, is connected with the Latin *vitulari*, to celebrate a feast.

**Fidei Commissum** (Lat. *commissum*, entrusted; *fidei*, to good faith). Term of Roman law. By the civil law of Rome, a citizen could neither make a foreigner his heir nor leave him any legacy. As foreign settlers (*peregrini*) became more numerous in Rome, citizens often desired to leave their property, or part of it, to some foreign friend. The only way to do this was to leave the property to a citizen, asking him to carry out the testator's wishes, and hand the property over to the foreigner. At first it was entirely optional on the heir whether he carried out the

request or not. It was left to his faith. But, in the end, *fidei commissum* became legally enforceable.

**Fidelity Guarantee.** Contract by which a person or persons undertake to make good losses due to fraud or negligence on the part of another person occupying a position of trust. Banks and business houses frequently require a guarantee of this kind on behalf of such of their employees as handle large sums of money, and many insurance offices, in return for an annual premium, enter into guarantees of this kind. Guarantee societies exist for the same purpose. See Guarantee; Insurance.

**Fidenae.** Italian town of Latium. It was situated about 5 m. N.E. of Rome, on a hill between the Anio and the Tiber. Frequently at war with Rome, it was finally conquered 438 B.C., and destroyed in the year following. Thereafter, though rebuilt, it never became a place of importance.

**Fides.** In Roman mythology, the goddess held as symbolical of faith and honour.

**Fief.** Name given to an estate held under the feudal system. It was, therefore, one which was held on condition of rendering certain services to an overlord, and which in certain eventualities reverted to that lord. The word is sometimes rendered in English as feu or fee. From it come fief, the one who receives the estate, and fiefment (*q.v.*), the act of granting it to him. See Feudalism; Land Laws.

**Field.** Anglo-Saxon word, meaning the open country. It is now used for a piece of enclosed land, *e.g.* a wheatfield, and by analogy we speak of a coalfield or oilfield. It is employed also in a military and sporting sense. In the former, field is a synonym for battle or battleground, *e.g.* the field of Waterloo. This use has many compounds, such as field ambulance, relating to war. In sport the field has various meanings, *e.g.* the horses in a race or the riders at a hunt meeting are the field; field sports are hunting, racing, and the like. See Cricket; Horse-Racing.

**Field.** In heraldry, the surface of an armorial shield on which charges are placed. The same term is applied to the body of a flag, *e.g.* the British white ensign is a red cross on a white field, with the union jack in a canton (*q.v.*).

**Field, THE.** London weekly newspaper devoted to all forms of sport, natural history, and country life occupations. Founded Jan. 1, 1853, by Bradbury and Evans, its first editor was Mark Lemon. Its prosperity dates from

its acquisition, in Nov., 1854, by Mr. Serjeant Cox, and the appointment in 1857 of J. H. Walsh ("Stonehenge"), as editor. Frederick Toms succeeded to the editorship in 1888, being followed in 1900 by William Senior (Red Spinner), who resigned at the close of 1909, when Theodore A. Cook (who was knighted in 1916) took over the editorship. Early in 1913 George Binney Dibblee became general manager. In 1919, with The Queen and The Law Times, The Field was purchased by the proprietors of Land and Water (*q.v.*).

**Field, SIR ARTHUR MOSTYN** (b. 1855). British sailor. Born June 27, 1855, he entered the navy in 1868, becoming commander, 1889, and admiral, 1913. His chief work was done in surveying, notably on the W. African coast, Strait of Magellan, S.E. American coast, Strait of Malacca, and the China Sea. He was hydrographer of the navy from 1904-9.

**Field, CYRUS WEST** (1819-92). American financier. Born at Stockbridge, Massachusetts, Nov. 30, 1819, he made a fortune and retired from business at the age of 33, when he became interested in the idea of the trans-Atlantic cable. In 1854 he organized the New York, Newfoundland, and London Telegraph Co., and 10 years later persuaded the U.S.A. and British governments to confirm by soundings the existence of Telegraph Plateau in the Atlantic. After various attempts the first cable was laid in 1859. Heavy financial losses necessitated Field's return to business, and he was an originator of the New York elevated rly. He died at New York, July 12, 1892. See Atlantic Cable.

**Field, EUGENE** (1850-95). American poet and journalist. Born at St. Louis, Missouri, Sept. 2, 1850, from 1883-95 he contributed to The Chicago Daily News a column entitled Sharps and Flats, in which most of his best work first appeared. His poems include A Little Book of Western Verse,



Cyrus W. Field.



Eugene Field.



1889, and With Trumpet and Drum, 1892, charming verses for children. His most attractive essays are collected in *The Love Affairs of a Bibliomaniac*, 1896. He died Nov. 4, 1895.

**Field Allowance.** Emolument granted to officers on going into camp or taking the field, in compensation for the extra expense of tent furniture, messing, etc.

**Field Ambulance.** Active unit of the Royal Army Medical Corps. Organized in companies for administrative purposes in peace time, the medical units are re-arranged for active service, and the field ambulance is the unit which can deal with all cases of wounds and sickness in their early stages, and which is sufficiently mobile to accompany the troops in the field. The personnel of a field ambulance numbers 10 officers and 241 other ranks, with 10 ambulance wagons, 6 general service wagons, 3 water-carts, and 3 forage-carts. They are divisional troops under the command of the administrative medical officer, and three field ambulances are allotted to each division in the field.

The cavalry field ambulance is a similar but smaller and more mobile unit, the personnel numbering 6 officers and 110 other ranks, with 6 light and 4 heavy ambulance wagons, 2 general service wagons, 2 water-carts, and 2 forage-carts. Four are allotted to a cavalry division and one to a detached cavalry or mounted brigade.

The general principle on which the field ambulances work is to treat slight cases which can be returned to their units, to give temporary aid to the more serious, and transport them to the clearing hospitals, and only to retain for any length of time such cases as it is inadvisable to move. *See Ambulance.*

**Field Dressing.** In modern armies a packet, containing antiseptic materials, stitched to the clothing of every officer and man proceeding to the firing-line. Recent wars have shown that uncomplicated wounds caused by modern high velocity bullets require little treatment beyond the exclusion of dirt and air, and consequently all ranks are now provided with a dressing for immediate application which will effect this purpose. The dressing actually consists of a pad of sterilised gauze or lint, to which is fastened a length of bandage so that it can be securely held over the wound.

**Fieldfare** (A.S. *feldfare*, field traveller). Bird of the thrush family. Visiting Great Britain in vast flocks in winter, it spends the rest of the year in Scandinavia



Fieldfare. Member of the thrush family, found in Great Britain

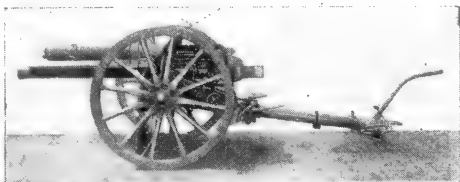
and Russia. In plumage and general appearance it closely resembles the common thrush, but it has not its vocal powers. It is seldom seen in parties of less than twenty, and often the flock will exceed a hundred. It feeds upon grubs, small snails, and berries. When feeding it continually advances in one direction, and a flock of the birds appears to move forward in open order with almost military precision. It nests in great colonies, and returns year by year to the same site, the nests being usually built in pine woods.

**Field-glass.** Small binocular telescope for viewing distant objects. The earlier field-glasses consisted simply of two short telescopes mounted side by side in a frame and focussed by means of a screw. The telescopes were of the "Galilean" type, in which the object-glass is a convex lens which converts the parallel beam of light from a distant object into a convergent pencil of rays. The tube is a short one, and before the convergent rays can come to a focus they pass through the concave eye-piece which transmits them to the eye as a parallel beam. In order that the images may be free from coloured fringes, it is necessary to substitute achromatic combinations for the simple lenses.

The advantage of this type of telescope for field-glasses lies in the shortness of the tube, its disadvantage in the narrowness of the field of vision. Rays from objects slightly off the direction in which the glass is pointed get lost inside the tube, and fail to reach the eye-piece. To avoid this defect, prisms were introduced into the tube to catch the aberrant rays and reflect them into the eye-piece. This was the origin of the modern form of field-glass, the prismatic binocular.

There may be one object-glass or two, but in either case the entering pencil of rays is reflected twice or more between parallel prisms, and finally directed into the eye-piece. This arrangement gives a wider field than in the simple type of field-glass, but as a certain amount of light is lost at each reflection the field is not so bright. In fact, the prismatic binocular was rendered possible only by the invention of a glass for the prisms which reflected a specially large percentage of the light falling on it. *See Telescope.*

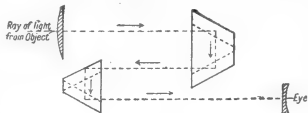
**Field Gun.** Mobile piece of artillery. It is mounted on wheels, and capable of horse transport of sufficient mobility to keep in touch with advancing infantry. The field guns of all the great powers have become standardised at about three inches calibre, and are capable of throwing a shell weighing about 16 lb. to an extreme range of 9,000 yards, the effective range being about 5,000



Field Gun. 18-pounder q.f. gun, unlimbered and ready for action

yards. The British weapon, known as the 18-pounder q.f., is larger than the majority, being of 3.3 ins. calibre and throwing a shell weighing 18½ lb. with a muzzle velocity of 1,590 ft. per sec. The weight of gun and carriage is 25 cwt., and with the limber 2 tons.

In the wider sense, field guns may be said to include all pieces of mobile artillery which accompany moving troops. The Royal Horse Artillery are equipped with a 13-pdr. gun, which is much lighter than the field gun, and enables the units to work with the cavalry. During the Great War artillery played a more important part, and in addition to the above, 6-in. and 8-in. howitzers, 9.2-in. and 12-in. guns and howitzers, and 15-in. howitzers were designed to accompany troops in the field, this being rendered possible by the improvements in mechanical haulage. *See Artillery.*



Field-glass. Diagram illustrating path of light in a prismatic field-glass

**Field Hospital.** Popular name for the clearing hospital, the nearest stationary, but mobile, medical institution to the actual battle line.

A clearing hospital is established by the Royal Army Medical Corps attached to each division in the field, and is situated in buildings—schools or similar structures for preference—in civilized country, or in tents and marquees when no better accommodation is available. Technically, it forms a unit of the evacuating zone, and is preferably placed out of the enemy's range, and near rail-head, but should be as close to the firing line as is practicable, and must be in touch with the field ambulances. The normal accommodation is for 200 casualties, but the equipment and organization must be such that far larger numbers can be dealt with if occasion demands.

It is the central point on which a definite section of the collecting zone converges, and the station to which the field ambulances bring casualties, and from which the latter are dispatched by ambulance train or water transport to the stationary hospitals. Transport for the hospital and for the wounded it has received are arranged by the inspector-general of communications. A clearing hospital only acts as a hospital in the generally accepted sense of the term during such time as it is unable to pass its patients farther down the line, and for such casualties as are unfit to be moved. *See Ambulance; Red Cross.*

**Fielding, HENRY (1707-54).** English novelist. Born near Glas-

tisbury, April 22, 1707, a scion of the Denbigh family, he was educated at Eton and at the university of Leiden, studying civil law. Coming to London about the age of 20, he gave up his legal studies and began to work for the stage.

He wrote a number of farces and other light pieces which have all passed into the limbo of literary curiosities. Called to the bar in 1740,

he was appointed justice of the peace for Westminster in 1749 and proved a conscientious and painstaking magistrate. His private life, how-



Field Hospital. Entrance to a clearing hospital on the Western Front during the Great War

ever, had not been beyond reproach and careless living had undermined his originally strong constitution. He died at Lisbon, whither he had gone for his health, Oct. 8, 1754.

Fielding's first novel, *Joseph Andrews*, appeared in 1742. It began as a deliberate caricature of Richardson's *Pamela*, then just published. As the narrative progressed, Fielding became interested in his characters; the caricature fades into the background, and the result is a human and lifelike story. *Joseph Andrews* was followed in 1743 by *Jonathan Wild*, a grim portrayal of the career of a consummate scoundrel. Then in 1749 came *Tom Jones*, which some critics regard as the greatest novel ever written. The plot is a masterpiece of construction, the narrative is Homeric in its power to sustain interest, while the intensely lifelike characters—the hard-drinking, hard-swearing Squire Western, his beautiful and lovable daughter Sophia, the hypocrite Bliffl, the egregious humbugs Thwackem and Square, and the ingenious Partidge—will live for ever.

Fielding's last novel, *Amelia*, 1751, is subdued in tone as compared with the boisterous high spirits of *Tom Jones*. It is to a certain extent autobiographical, the original of the erring Captain Booth being Fielding himself. *Amelia* was the favourite novel of Thackeray, who gives a masterly appreciation of Fielding in his *English Humourists*. *See English Literature; Novel; consult also The History of Henry Fielding, W. L. Cross, 1919.*

**Fielding, WILLIAM STEVENS (b. 1848).** Canadian statesman. Born at Halifax, Nov. 24, 1848, he became a journalist. In 1882 he entered the legislature of Nova Scotia, and from 1884-96 was prime minister of that province. In 1896 he entered the Dominion parliament, and from 1896-1911 was minister of finance in the Laurier cabinet, being responsible for tariff changes. In 1921 he again became minister of finance.



W. S. Fielding, Canadian statesman  
Russell

**Field Kitchen.** Boiler and self-contained furnace mounted on wheels for horsed transport. It is sufficiently mobile to move with



Field Kitchen, of British Army pattern, in use on the Western Front during the Great War

Marching infantry. Field kitchens enable soup and stews to be cooked while on the march. *See Supply.*

**Field Madder** (*Sherardia arvensis*). Annual bristly herb of the natural order Rubiaceae. It is a native of Europe, Asia, and the Canaries. Its trailing stems, a foot or more in length, spread from the root, and are clothed with whorls of sharp-pointed lance-shaped leaves. The lilac funnel-shaped flowers are about  $\frac{1}{2}$  in. across. It grows in cornfields and pastures.



Field Madder. Spray of foliage and flower, and a detached leaf



*From a print*

**Field-Marshal.** The highest title of rank in the British army, equivalent to admiral of the fleet in the navy.



Field-Marshal. Shoulder strap of the highest rank in the British Army

It was instituted in 1736 when George II conferred the rank on John, duke of Argyll. Any officer on either the active or retired lists may be promoted to field-marshal without reference to seniority, but it is laid down that there shall not be more than eight field-marshals on the active list. Colonels of the Royal Artillery, Royal Engineers, King's Royal Rifle Corps, and the Rifle Brigade are selected from the field-marshals, who are also eligible for appointment as governors of the Tower and Chelsea Hospital. The pay of a field-marshal is dependent on the appointment he actually holds, his half-pay is £1,300 per annum, and his gratuity for a serious wound, £3,500. Actually, the title is conferred on the most distinguished soldiers of the day, and the holders carry a baton in addition to their swords when in full dress. *See Marshal*; also illus. pp. 968 and 2806.

**Field Mouse.** Name erroneously given to several small rodents, both mice and voles. It is correctly



Field Mouse. Brown, long-tailed *Mus sylvaticus*

applied only to *Mus sylvaticus*, the wood mouse, otherwise called the long-tailed field mouse, a common pest in most parts of England, in gardens and hedgerows, and occasionally in corn-stacks.

**Field Officer.** Any officer below the rank of general and above the rank of captain. These officers were mounted in days when other infantry officers marched on foot with their companies. Field officers not having the charge of companies, etc., were assigned special duties, such as presiding at courts-martial, inspection of guards. A brevet major, being a regimental captain, would perform either class of duty as required. Sentries pay compliments to field officers by presenting arms. *See Colonel*; *Major*.

**Field of the Cloth of Gold.** Term applied to the meeting-place of Henry VIII and Francis I of France, June 7-24, 1520. The meeting took place near Guines, and the name was given to it on account of the magnificence displayed.

**Field Punishment.** Punishment authorised by the Army Act

fleet-footed retainers of the chief carried round among the Scottish clansmen to call them together in time of emergency. Disobedience to the summons rendered any man between the age of 16 and 60 liable to the extreme penalties of fire and sword, emblematically denounced by the bloody and burnt marks



Fiery Cross, from a painting by J. Drummond, R.S.A., depicting the bearer of the fiery cross carrying his summons by boat from village to village

*J. Caird Inglis*

to be inflicted on private soldiers on active service in consequence of the lack of prisons or detention barracks. Field punishment No. 1, abolished in 1923, involved such restraint as is usual in cases of imprisonment with hard labour, and in addition the prisoner could for three days out of four be "attached to a fixed object," such as a tree or a gunwheel, with straps or ropes, for not more than two hours a day. This mode of restraint could not, however, be adopted for more than 21 days in all. *See Court Martial*.

**Field-train.** Name given to the transport allotted to fighting units for the conveyance of the stores, supplies, and baggage necessary for their subsistence. The train is divided into two sections, baggage and supply, the latter being known as first line transport, since it is an integral part of the fighting unit, without which the necessary tactical functions cannot be performed. *See Supply*; *Transport*.

**Fieri facias** (Lat., cause thou to be made). Term of English law. It refers to a writ of execution directed to the sheriff of a county, ordering him to cause to be made of the goods of A. B. a sum of money due by A. B. on a judgement.

**Fiery Cross.** Charred sticks dipped in goat's blood and usually joined in the form of a cross, which

upon the signal. During the "Forty-five" the fiery cross made many circuits. A fine description of the custom is given in Scott's *Lady of the Lake*, Canto III.

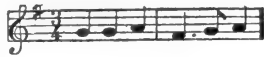
**Fiery Serpent.** Name given to the serpents sent to the Israelites in the wilderness (Num. 21). They were probably sand snakes, called fiery because of the effect of their bite. *See Snake*.

**Fiescherhorn.** Mt. of Switzerland. In the Bernese Oberland (*q.v.*), near Grindelwald, its height is 13,286 ft. The ascent from the Bergli Hut by the Mönch-Joch should not be attempted without the help of a guide.

**Fiesole** (anc. *Faesulae*). City of Italy, in the prov. of Florence. It stands on an eminence overlooking the valley of the Arno, 3 m. N.E. of Florence. It was one of the 12 Etruscan cities, and is enclosed by crumbling cyclopean walls. Its cathedral, founded early in the 11th century, contains many interesting paintings and sculptures. Straw-plaiting is carried on by the inhabitants. Here in 225 B.C. the Gauls defeated the Romans, and Sulla's veterans formed a colony, later the headquarters of Catiline. For long an opulent city, its prosperity waned as Florence grew in power. Pop. 10,434. *Pron.* Feeay-zoly.

**Fife** (Fr. *fifre*, Ger. *Pfeife*, Lat. *pipare*, to chirp, pipe). Small flute used for military marching. It is associated with drums when a full band is not available. In a drum and fife band the chief melodic work is allotted to the B flat fifes, arranged to play in unison or in two or three parts; they are assisted in lower notes by larger flutes, in F and in E flat, and in the higher ranges by piccolos (*q.v.*) in F and in E flat. As the open key of all the flutes is called D, transpositions are reckoned from D, instead of from C, as is the case with most other instruments. For example, the first two bars of "God Save the King," in key B flat, would be written as follows to secure a unison effect:

Piccolo in F.

Piccolo in E $\flat$ .Fife in B $\flat$ .

Flute in F.

Flute in E $\flat$ .

and the actual pitch would be :



In fife bands the percussion instruments include side-drums, bass drum, cymbals, and triangle.

**FIFE OR FIFESHIRE.** Eastern maritime and peninsular county of Scotland. Lying between the Firth



Fifeshire arms

of Tay and the Firth of Forth, its area is 504 sq. m. The surface alternates between hill ridges and fertile and well-cultivated valleys, the highest eminence being

West Lomond, 1,713 ft. There are several small lakes; of the rivers, the Eden and Leven are the largest. Nearly 75 p.c. of the soil is cultivated, a large area being permanent pasture; wheat, barley, oats, and potatoes are raised. The mineral wealth of the county is largely represented by coal, but limestone,



Fife. Map of the Scottish county north of the Forth

ironstone, freestone, and oil-shale are also worked. Most of the coast towns and villages engage in fishing, and the linen and floor-cloth manufactures are prominent. St. Andrews has a university, and is an important golf centre. The rly. is the N. B. R. Two members are returned to Parliament. Cupar or Cupar-Fife, the county town, Kirkcaldy, Dunfermline, St. Andrews, Cowdenbeath, and Buckhaven are the largest towns. Pop. 267,739. Evidences of Roman occupation exist, and other ancient objects of interest are the monastic ruins found in many parts of the "kingdom," as the county is still popularly called.

**LITERARY ASSOCIATIONS.** To Cupar belonged Sir David Lindsay, the 16th century satiric poet, and another of the Lindsay of Fife was Lady Anne Lindsay, who wrote *Auld Robin Grey*. Adam Smith, the political economist, was born at Kirkcaldy, while Balwearie, near by, was the birthplace of Michael Scott the "wizard." At Kirkcaldy, too, Thomas Carlyle sojourned as the pupil of Edward Irving. To Pitloir belonged Miss Campbell, who wrote *The March of the Cameron Men*. At Lower Largo was born Alexander Selkirk, who is immortalised as Defoe's Robinson Crusoe, and is the subject of a poem by William Cowper; a niched statue of him as Crusoe was erected here in 1885. St. Andrews, which is crowded with associations with notable students, has memories of George Buchanan and of John Knox, who began his work as reformer here.

**FIFE.** Settlement in Northern Rhodesia, on the Stevenson Road from Lake Nyasa to Lake Tanganyika.

**FIFE, EARL AND DUKE OF.** British titles born by the family of Duff. In 1735 a certain William Duff,

who had been M.P. for Banffshire, where he owned large estates, was made an Irish peer, as Baron Breco. An earldom followed in 1759. James, the 4th earl, was a major-general in the Spanish army during the Peninsular War, and James, the 5th earl, was made a British peer as Baron Skene in 1857. He died in 1879 and his son and successor was the nobleman who married Princess Louise. He had been previously made a British peer (1885), and in 1889 he was created marquess and duke. He died in 1912, when his Irish title became extinct, but the newer ones passed by special remainder to the elder of his two daughters, who became duchess of Fife. The duke had enormous estates in Banffshire and Aberdeenshire, but much of his land has been sold. His chief seats were Mar Lodge, Braemar, and Duff House, Banff. The heir to the title is known as the earl of Macduff.

**FIFE, ALEXANDER WILLIAM GEORGE DUFF, DUKE OF (1849-1912).** British nobleman. Only

Duke of Fife  
Downey

son of the 5th earl of Fife, he was born Nov. 10, 1849, and was educated at Eton. He sat in the House of Commons for the counties of Elgin and Nairn, from 1874 until he succeeded to the peerage in 1879. In 1889 he married Louise, eldest daughter of the prince of Wales, and was created duke of Fife. He died at Assuan Jan. 29, 1912, from a chill contracted at the wreck of the steamer *Delhi* off Morocco, and was buried Aug. 8, 1912, at Braemar.

**Fife**, ALEXANDRA, DUCHESS OF (b. 1891). British princess. The elder daughter of the duke of Fife



Princess Arthur of  
Connaught,  
Duchess of Fife  
Corbett

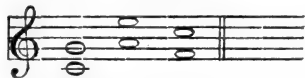
and Louise, daughter of Edward VII, she was born May 17, 1891. In 1912, on the death of her father, she succeeded by special remainder to his dukedom and some of his other titles,

and on Oct. 15, 1913, she was married to her cousin, Prince Arthur of Connaught. A son, the earl of Macduff, was born Aug. 9, 1914.

**Fifteenth.** In English history, a tax usually associated with a tenth. Taxation of property other than land began in the time of Henry II, and in 1193 one-fourth of their incomes was demanded from laity and clergy alike. Succeeding taxes of this kind were levied, but the amount varied from a fourth to a fourteenth. Officials from the exchequer arranged for a fixed amount from each shire, leaving it to the sheriff to collect it from individuals. After 1290 it was a grant voted by Parliament, each estate voting its own share to the king. Tenths and fifteenths became the regular amount of the votes, townsfolk, i.e. the owners of personal property, paying one-tenth of their incomes and those in the country one-fifteenth.

The next charge was to make the amount voted a fixed sum, done by taking the assessment of 1332, which produced £39,000. Henceforward £39,000 represented a tenth and fifteenth, and if more money was needed Parliament voted two tenths and fifteenths. In later votes certain towns were sometimes excepted, and the assessment became antiquated and unfair as conditions changed. The last vote of this kind was in 1624; its place being taken by the subsidy (q.v.). See Taxation; Tenth.

**Fifth.** Musical interval. A fifth includes five scale names in order, as C, D, E, F, G. Therefore C to G is a fifth, and as G occurs in the major scale of C, this fifth is called perfect, or by some major. See Consecutive; Interval.



**Fifth Monarchy Men.** Sect of the Puritan period in England who believed that a millennium or kingdom of Christ upon the earth was at hand. This was to be the fifth

monarchy of the world, the earlier ones being the empires of the Assyrians, the Persians, the Greeks, and the Romans. The Fifth Monarchy men were to be found in considerable numbers in Cromwell's army. In 1661, shortly after the Restoration, they took part in a revolt in which many were killed.

**Fig** (*Ficus carica*). Tree of the natural order Urticaceae, native of the Mediterranean region. It attains a height of 20 ft. to 30 ft., and has large, lobed, alternate leaves, rough above and downy beneath. The sexes are in separate flowers, but on the same tree. The minute blossoms are contained inside a hollow, pear-shaped flower-stalk. Externally nothing indicates the presence of flowers, and but for the ministrations of a small wasp (*Blastophaga grossorum*), it would be impossible for the pollen of the males to reach the female flowers. In the same receptacle as the male flowers are some aborted females, and these are attacked by the female wasp, which lays its eggs in them.



Fig. Tree of *Ficus carica* and, right, branch with leaves and fruit

The wasp-grubs feed upon their cradles, and in due time become wasps. In seeking the external air they have to pass among the male flowers, and get dusted with their pollen. Then they are attracted by the odours emanating from a cavernous stalk containing female flowers, and enter it, shaking off much of the pollen that covers their bodies; and thus the female flowers are pollinated and the flower-stalks become swollen and juicy. Numerous other species of the genus *Ficus* in other parts of the world bear edible fruit, such as *F. roxburghii* (India), which has them in clusters from the bare trunk, quite near the ground.



Figaro, as presented  
by Coquelin aîné

**Figaro.** Central character, the barber himself, in Beaumarchais' comedy, *The Barber of Seville*. Valet, poet, dramatist, etc., he is the personification of the easy gaiety which has come to be accepted as a type of the witty social philosopher. Encouraged by the success of *The Barber of Seville*, 1775, Beaumarchais wrote *The Marriage of Figaro*, which, how-

ever, was not acted until 1784, and he also introduced Figaro into *La Mère Coupable*, 1792. Mozart wrote an opera on *The Marriage of Figaro*, and Rossini one on *The Barber of Seville*. See Beaumarchais.

**Figaro**, LE. Satirical journal founded in Paris, 1826. It was named after the hero of two of Beaumarchais' comedies, and contributed to by Jules Janin, Alphonse Karr, and George Sand. It ran till 1833. The title was revived for a weekly started by J. H. de Villemessant, April 22, 1854. This became a morning daily devoted to politics and literature in 1866, its writers including Edmund About, Gabriel Hanotaux, Pierre Loti, Edmund Rostand, and Ernest Daudet. Under the control (1901-14) of Gaston Calmette, who was shot by Mme. Caillaux, wife of the French finance minister, March 16, 1914, it enjoyed a great vogue as a society as well as a literary organ. It publishes a literary supplement, and a monthly, *Le Figaro Illustré*.

**Fighting Fish.** Name given to a small fresh-water fish, *Betta pugnax*, found in Asia and Africa. The Siamese breed it for fighting contests, as it fights furiously when matched with an opponent. It assumes vivid colours under excitement.



Fighting Fish, the Japanese *Betta splendens*



**Fighting Top.** In ancient naval warfare, a platform or large barrel high up on the mast from which heavy weights could be thrown into any vessel lying alongside, either to disable men or to drive a hole through the bottom of the ship. Later on, fighting tops were occupied by archers and riflemen; in sailing ships they were represented by the "tops," or platforms built at the head of the lower masts, where picked marksmen were stationed during close-fought actions. It was from the mizen-top, the platform on the after-mast, of the Redoubtable that the shot was fired which killed Nelson.

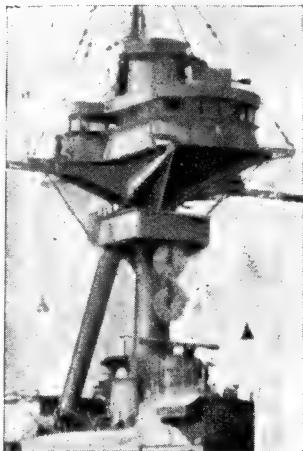
In the later years of the pre-Dreadnought era fighting tops were equipped with machine and light quick-firing guns for driving off hostile torpedo-craft, but as the size of the latter and the range of torpedoes increased, it became impossible to mount in these positions guns sufficiently heavy and far-reaching for the purpose. Modern ships still have large structures built high up on the masts, but these are occupied in action by the spotting officers and apparatus connected with fire-control. See Battleship.

**Figig.** Walled oasis of Morocco, on the borders of Algeria. It lies three miles N.W. of Beni Unif, and 165 m. E.S.E. of Fez, and is a station on the rly. from Oran to Colomb Bèchar. There are 250,000 date palms and a considerable trade is carried on with Morocco. The inhabitants, numbering about 15,000, belong to the Amour tribe. After a revolt in 1903, order was established by a French military mission. Alt. 2,700 ft.

**Figline.** Town of Italy, in the prov. of Florence. It stands on the river Arno, 15 m. by rly. S.E. of Florence. It manufactures wine and cutlery, and straw-plaiting is carried on. In the vicinity is Monte Ferrato (alt. 1,385 ft.), noted for its quarries of serpentine. Pop. 12,035. Pron. Fil-yeny.

**Fig Marigold** (*Mesembryanthemum*). Large genus of fleshy herbs and sub-shrubs. Of the natural order Ficoideae, they are natives of hot, dry climates, especially S. Africa. The leaves vary greatly in the different species; the flowers are large and conspicuous, white, yellow or red, with many long, slender petals. See Ice-plant.

**Figueira, GUILLEN** (c. 1190-1250). One of the later Provençal troubadours. He was born at Toulouse, and is reported to have been a tailor. When the persecution of the Albigenes took place, he wrote vigorously in their defence, and on the persecutors'



Fighting Top or Fire Control platform of the battle cruiser Renown

Cribb, Southeast

capture of Toulouse took refuge in Italy. In the struggle between the Empire and Rome he sided with the former, and one of his *servantes* is a denunciation of the latter. He also composed some notable love songs. Pron. Feegayeera.

**Figueras.** Town of Spain, in the prov. of Gerona. It stands in a fertile plain near the French frontier, 27 m. N.E. of Gerona on the Barcelona-Perpignan Rly. The town is strongly fortified, with a citadel built by Ferdinand VI, which has been called the key of the frontier. There is some trade in soap, wine, leather, and textiles; gold and copper mines are in the district. The town fell three times to the French—in 1794, 1808, and 1823. Pop. 11,778. Pron. Feegayrahass.

**Figueras y Moracas, ESTANISLAO** (1819-82). Spanish statesman. Born at Barcelona, Nov. 13, 1819, he studied law. As a republican he was elected to the Cortes in 1851. Prominent in the revolution of 1868, he strongly opposed all attempts to restore the monarchy, and upon the establishment of the republic of 1873 became president of the provincial council of ministers. He occupied a prominent position in politics until 1874, when the restoration drove him into retirement. He died at Madrid, Nov. 11, 1882.

**Figure Number.** Term used in mathematics. In an arithmetical progression, if the first number is a unit and the successive numbers differ from it by whole numbers, as in such a series as 1, 2, 3, 4, 5, then a new series may be formed by adding together the first two terms, then the first three terms, then the first four terms, etc. The new series would thus be 1, 3, 6,

10, 15. These numbers are called figurate numbers. Similarly another series, 1, 4, 10, 20, 35, etc., might be formed from the second series.

**Figured Bass.** In music, a bass part provided with figures to indicate the chords which should be added to it. See Basso Continuo.

**Figure-Head.** Image painted or carved on the prow of a war vessel. It doubtless originated in the sentiment that a ship was a living thing and should be given in at least one respect the external appearance of one. Possibly, too, the ferocious aspect of a grotesquely shaped animal in the bows had some sort of moral effect upon ancient or uncivilized warriors.

In the days of the oared galley the figure-head was made to fill the purpose of an above-water ram. Projecting further in advance of the bow than the ram below water, it was driven with such force against an enemy's side as to cause the vessel to heel over, thus giving the submerged projection the opportunity of striking in a more vulnerable and vital part of the hull. When the sail superseded the oar as a means of propulsion, the figure-head ceased to have any practical value, but it was retained for ornament, and as an expression of sentiment. No British warship has had a figure-head, or even a bow scroll, for many years, excepting only the Triumph and Swiftsure, which were completed as they were designed for the Chilean navy. Many figure-heads of old British warships are to be seen in naval museums in the royal dockyards and elsewhere. ○

**Figwort** (*Scrophularia*). Large genus of herbs, of the natural order Scrophulariaceae. They are natives of Europe, Asia, N. Africa, and America. They have tuberous or creeping rootstocks, opposite leaves, and somewhat globular flowers of a greenish-purple or yellow hue, succeeded by a two-valved capsule. As a rule they have an unpleasant odour. *S. nodosa*,



Figwort. Leaves and flowers of the knotted figwort

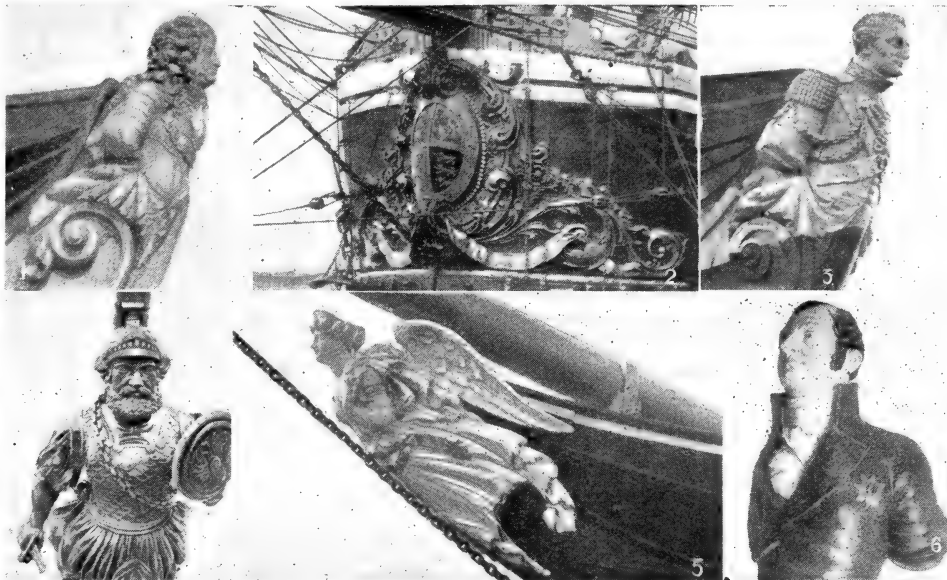


Figure-heads in the British navy. 1. Marlborough, old three-decker wooden sailing ship now in Portsmouth harbour. 2. Minotaur, ironclad cruiser built in 1863. 3. Duke of Wellington, built in 1852. 4. Warrior, the first ironclad, launched in 1860. 5. Iris, steam and sail ironclad built in 1877. 6. Figure-head intended for Royal Frederick, 1841

Photos 1, 2 and 5, H. Symonds & Co., Portsmouth; 3, 4 and 6, Cribb, Southsea

the knotted figwort, is used by farmers to make a decoction for the cure of scab in swine.

**Fiji or Viti Islands.** Crown colony of the British Empire. It consists of a group of nearly 250 islands and islets in the S. Pacific Ocean, lying between lat. 15° and 20° S., and long. 175° E. and 178° W. The total land area, including Rotumah, is 7,083 sq. m.



Fiji Islands arms

About 80 of the islands are inhabited, but only three are of large size, viz. Viti Levu (area 4,053 sq. m.), Vanua Levu (2,130 sq. m.), and Taviuni (217 sq. m.); the chief of the smaller islands are Ovalau, Kandavu, Ngau, Koro, and Rotumah. The remainder are islets and atolls, bounded by reefs.

The islands are of volcanic origin, but beyond a few thermal springs there are no signs of recent activity. The larger islands are mountainous, rising to 4,000 ft. and 5,000 ft., densely forested in parts, and abounding in valuable woods, but the sandalwood for which the Fijis were formerly noted is almost exhausted. There are many good harbours and a few navigable rivers. The climate is healthy and agreeable, the rainfall plentiful; the mean temperature is about 70° Fahr., and malaria is rare. The islands are subject to

hurricanes between Dec. and April. The soil is extremely fertile, the chief products being coconuts, sugar, cacao, yams, bananas, maize, rice, tobacco, rubber, and turmeric. Horses, cattle, sheep, and goats are reared in large numbers. The



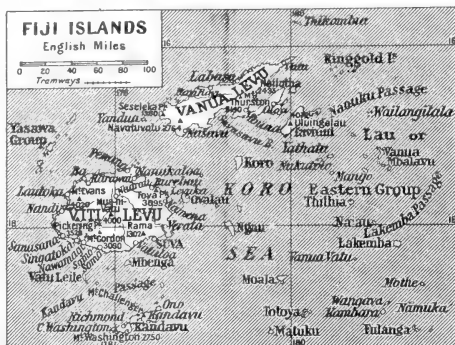
natives are of Malayan-Polynesian stock.

The chief exports include sugar, copra, molasses, cotton, rubber, green fruit, and sici shell. Steamer communication is maintained with Australia, New Zealand, Honolulu,

Canada, Tonga, and Samoa. The exports amounted to £2,896,448 and the imports to £1,673,121 in 1920, more than three-quarters of the trade being done with British possessions. The capital is Suva on the S. coast of Viti Levu, and there are wireless telegraphy stations at Suva, Taviuni, Labasa, and Savusavu. There are two grammar schools at Suva and one at Levuka on Ovalau, under government control. The religions are mainly divided between the Protestant and Roman Catholic faiths. Money, weights, and measures are the same as in Great Britain.



Fiji. Native man of Malayan-Polynesian origin. Left, Fijian girl



Fiji. Map of the South Pacific islands ceded to Great Britain in 1874

The Fiji Islands were ceded by the ruling chiefs to the British Empire on October 10, 1874, and are administered by a governor appointed by the crown, who is assisted by executive and legislative councils, but a fair amount of self-government is allowed. The governor is high commissioner and consul-general for the West Pacific. The islands were discovered by Tasman in 1643 and visited by Cook in 1769. Pop. 163,416, of whom 87,761 are Fijians, 61,745 Indians, 4,800 Europeans, the remainder being Chinese, Polynesians, and Rotumans.

**Filangieri, GAETANO** (1752-88). Italian lawyer. The son of Caesar Filangieri, prince of Arianiello, he was born at Naples, Aug. 18, 1752, and became a lawyer. He is chiefly known for his work, *The Science of Legislation*, which secured a European reputation. This is unfinished, only four out of its six books being completed; it deals with legislation, economics, and education, and shows its author as a thinker much in advance of his time. Filangieri passed much of his life in Spain, where he held appointments at court, and he was there when he died, July 21, 1788. *The Science of Legislation* has been translated into English by Sir R. Clayton, 1806.

Filangieri had a son, Carlo (1784-1867), famous as a soldier in the French service. He began his career under Napoleon and saw service at Ulm, Austerlitz, and elsewhere. He was afterwards in Spain, but his name is chiefly associated with Sicily. In 1848 he was sent there by Ferdinand II, king of Naples, to subdue the rebels, which he did. He remained in the island as governor until 1855. In 1859 he was made prime minister by Francis II, king of Naples, but he soon resigned because his suggestions for a more liberal form of government were rejected. Made prince

Southern Asia, Egypt, Australia, and Brazil, lives in its adult stage in the lymphatic glands, while its embryos, *Microfilaria sanguinis-hominis*, are found in the blood. It is conveyed by the bite of a mosquito, and is the cause of elephantiasis and haematuria. *Filaria medinensis* is known as the guinea worm, and encysts under the skin of the back and legs, forming serious subcutaneous abscesses. The larval stage is passed in the cyclops, and the larvae probably conveyed to man by drinking impure water. See Tropical Diseases.

**Filariasis.** Disease caused by infection with a nematode worm belonging to the family Filariidae. Several genera and species are recognized, but by far the most important is the *Filaria bancrofti*. See Elephantiasis.

**Filbert.** Fruit of the cultivated hazel. In it the leathery husk is greatly extended so as to conceal the nut. Its proper name is Philibert nut, so called from S. Philibert, whose day is kept Aug. 22 during the height of the nutting season. See Hazel.

**Fildes, SIR LUKE** (b. 1844). British artist. Born at Liverpool, he studied at Chester, Warrington, South Kensington and the Academy schools. He began his career with black and white work for *The Graphic*, contributing a sketch of Casuals for the first number, 1869; this was, in 1874, the subject of a popular picture at the R.A.



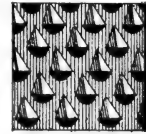
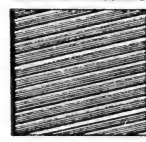
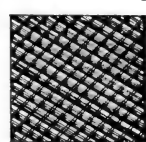
He illustrated Dickens's *Edwin Drood*. *Casuals* was followed by *The Doctor*, 1892 (*Tate Gallery*), which set the seal on his reputation as a painter of

of Satriano, he died Oct. 9, 1867.

**Filaria** (Lat. *filum*, thread). Genus of Nematode or thread-like worms, many of which are parasitic in the bodies of man and other animals. Certain of these minute worms are the cause of various diseases, most of them peculiar to tropical countries. *Filaria bancrofti*, which occurs in

pathetic subjects. In 1887 he turned to portraiture, and afterwards produced little else. In 1901 he painted the official portrait of King Edward VII, and in 1905 that of Queen Alexandra. He was elected A.R.A. in 1879 and R.A. in 1887. Knighted in 1906, he was created K.C.V.O. in 1918.

**File.** Important hand tool used largely in the metal industries. Its purpose is to smooth down, by means of sharp edges or points



File. Top, double-cut rough file; centre, single-cut rough file; at foot, horse rasp, showing burrs

formed upon its surface, a rough or irregular surface or remove a film or excrecence of material. Files are also used to sharpen saws. Many varieties are used: flat, taper, round, square, three-square or triangular, half-round, and rat-tail. In flat files both faces and edges may be cut; if one edge is left smooth the file is said to have one "safe-edge."

Standard files are single cut or double cut. The best files are made of the finest crucible cast steel; the cutting edges are formed by means of a short chisel, which is held at a particular angle on the "blank," as the uncut shape is called, and struck with a hammer. A rasp is a file in which a series of strong burrs are made by a pointed punch.

The cutting begins at the point of the file and advances by steps according to the intended fineness of the file. After the first cutting is finished, if the file is to be double cut, it is gone over again with the chisel held so as to cross the former cuts at an angle. Cutting surfaces of files are distinguished in a complete series as rough, middle cut, bastard, second cut, smooth and dead smooth. The sizes range from a watchmaker's tool, about three-quarters of an inch long, to files three feet in length. Most classes are provided with a "tang," a pointed end intended to be driven into a wooden handle. The best files are still cut by hand, though file-cutting machines are now largely in use. Files are cut while the blanks are in the soft or annealed state, and are afterwards hardened, great care being taken to avoid distortion of their shapes. Skill in filing, the ability to file a

surface flat, is the hall-mark of a good mechanic; but machine tools have diminished the importance of the art.

**File** (Lat. *filum*, thread). Military term for soldiers formed up behind one another. In the British army men fall in in two lines; those abreast form the ranks; each man in the front rank with the man immediately behind him forms a file. When numbered off, the front rank man numbers for his file, odd numbers being called right, even numbers left, files. When the total of the men in the squad is an odd number the last man but one in the front rank, who is known as a blank file, has no man to cover him.

**Filey.** Urban dist. and seaside resort of E. Riding of Yorkshire, England. It is 9 m. S.E. of Scarborough on the N.E.R., and is pleasantly situated on the cliffs overlooking Filey Bay with a fine stretch of firm sand, a good promenade, and golf links. The urban council owns the gas and water-works. Filey Brigg, on the N. part of the Bay, is a ridge of sandstone stretching  $\frac{1}{2}$  m. out to sea. S.



Filey arms

Filey. The town and sea front seen from the North Cliff



Filey. The town and sea front seen from the North Cliff

Oswald's, a cruciform building, partly of Norman work, is the chief church. Until recently the boundary between the E. and N. Ridings of Yorkshire separated this church from the town proper. Roman antiquities have been discovered here. Pop. 3,228.

**Filibuster.** General term for a freebooter. It is now used of private individuals who wage unauthorised warfare against a foreign state. In the U.S.A. obstructive legislators are called filibusters. The word was originally applied to the buccaneers or 17th century pirates of the West Indies, and is used specifically for the adventurers who,

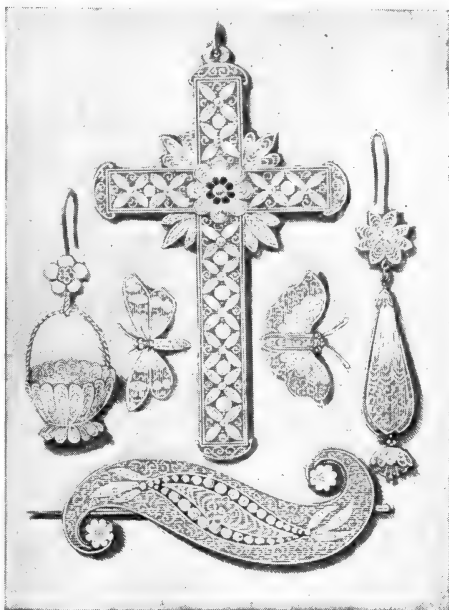
after the Mexican war, organized expeditions in the U.S.A. to fight in Spanish-American revolutions, e.g. Narciso Lopez against Cuba (1850-51) and William Walker against Nicaragua (1855-60). The Spanish form of the word is *filibustero*, a corruption of Dutch *vrijbuiter* (vrij, free; buit, booty).

**Filigree** (Lat. *filum*, thread; *granum*, grain). Form of decorative work carried out with fine wire of gold, silver, or copper. It has been used for jewelry and ornament from prehistoric times, sometimes alone, sometimes in combination with solid metal, enamel, and precious stones. The Etruscans and later the Byzantines

work filling in the space between the outline of thicker flattened wire. Maltese filigree is like cobwebby lace, and so is much of that from Portugal.

Apart from articles for personal adornment, filigree decoration was largely used in medieval times for embellishing reliquaries, and, from this, detached lacework in Gothic architecture is sometimes called filigree work.

There are two types of filigree glass: (1) interwoven or spirally twisted clouded or coloured threads embedded in the glass; (2) surface decorations or other ornaments carried out in glass threads. See illus. p. 1537.



Filigree. Examples of modern Genoese filigree work in finely drawn silver wire

**Filing.** Method by which correspondence or other records are kept in order to be available for quick and easy reference. In business circles flat filing, i.e. using a board with a metal holder attached to it, which can be opened and closed at will, took the place of a spiked wire, and in its turn gave way to the vertical filing system introduced into England between 1890 and 1900.

The primary idea of vertical filing is to bring together in one place all letters to and from a customer or client, and to arrange them in such a way as will give instant access to any particular one. Each correspondent has a separate folder, in which the letters are arranged in chronological order, and the folders are arranged in cabinets. See Card Index; Indexing.

**Filipescu, NICOLA** (1857-1916). Rumanian statesman. After studying law in Paris and returning to



Rumania, he was elected a deputy, and in 1900 became minister of agriculture and domains. Minister of war, 1911-12, he was largely responsible for the reorganization of the army. On leaving the war office he was minister of agriculture until 1913.

On the outbreak of the Great War he was a strong advocate of the participation of Rumania on the side of the Allies. He died on Oct. 13, 1916.

**Filipinos.** Name applied generally to the native inhabitants of the Philippine Islands (*q.v.*). They belong to tribes of Malayan stock. The Liga Filipina was founded about 1890 by Dr. José Rizal (*q.v.*) with the object of securing more freedom for the inhabitants than they then had under Spanish rule, and subsequently the term Filipino came into general use.

**Filite.** Italian propellant. Ballistite was adopted as the standard propellant by the Italian Government very soon after it was invented by Nobel, but whereas the original ballistite was in the form of flakes, the Italians drew it into fine threads by the addition of a solvent and named it filite. See Solenite.

**Fillan** (d. c. 777). Early Scottish saint. According to the Aberdeen breviary, he was the son of S. Kentigerna, and early in life became a monk. He lived for some years in a cell near St. Andrews, where he was later elected abbot. Resigning this position, he retired to Glendochart in Perthshire, where he founded a church, which he served. He was buried at Strathfillan, Perthshire.

**Filler.** Word used in several senses, and specially applied to the contents of a cigar which are surrounded by the wrapper. In preparing ground for building, and in canal or rly. work, etc., a filler is the man who fills the barrows or trucks with excavated material.

**Fillet** (Old Fr. *filet*, little thread). Term in architecture, signifying a narrow moulding or flat band in a moulding. It is also used to indicate the flat ridge between the flutes of a shaft. See Fluting; Moulding.

**Fillmore, MILLARD** (1800-74). President of the U.S.A. Born Feb. 7, 1800, in New York state, the son of a settler, he had a rough boyhood. Apprenticed to the cloth trade, he began to study law, and earned a livelihood by teaching at Buffalo until qualified to practise. This he did at Aurora, where he was soon the head of a prosperous firm. In 1829 he entered the legislature of New York. This led to Congress, wherein he sat as a Whig, 1833-35 and 1837-43, becoming a prominent speaker in the House of Representatives. In 1848 he was chosen vice-president, and in July, 1850, he succeeded to the presidency.

On the slavery question Fillmore was a moderate. On the one side he pressed forward in 1850 the



Millard Fillmore

fugitive slave law and other measures of compromise; on the other he had supported legislation for preventing the extension of slavery outside the existing slave states. In 1850 the Whigs declined to put Fillmore forward, and when he stood for president in 1854 only one state supported him. He died at Buffalo, March 8, 1874.

**Film.** System of photography in which a flexible material is used in place of glass plates as the support of the sensitive emulsion in the making of negatives. Its advantages are reduction of weight and the facility of loading the camera and developing the negatives without a dark-room, and non-liability of the negatives to breakage when stored. Celluloid is almost exclusively used as the flexible support; paper is employed to a slight extent. The sensitive film is generally used as a long band wound on a spool or bobbin along with a longer band of black paper, the extra length of which at each end allows of the spool being inserted in one chamber of a film-camera, and then of the film being wound on to a second but empty spool after exposure.

Owing to the enveloping black paper both operations can be done in full daylight, and material for any number of photographic subjects thus carried and used without a dark-room. The modern use of films dates from 1891, when this so-called "daylight loading" was introduced commercially by the Eastman Kodak Co. for the Eastman roll-film introduced in 1889. In 1914 a new (autographic) pattern of Eastman film spool was introduced in which, by means of a special paper between the film and the black paper, the title or date of exposure may be impressed below the negative when taking the photograph.

Emulsion-coated film of stiffer substance is also used in cut pieces, and is handled very similarly to dry plates. Emulsion-coated paper for the making of negatives is also made in relatively small quantity in cut sheets. (See Photography.)

Film is also used as a general term for the cinematograph industry, in which the photographic film is a prime factor. Plays written for the film are examined in Great Britain by a board of film censors, who in 1919-20 examined 6,233,155 feet of film, embracing

2,311 subjects. A large number of persons earn a livelihood by working for the great companies that prepare films for the public, while the works of many novelists are adapted for this purpose. See Cinematography; Picture Theatre.

**Filmer, SIR ROBERT** (d. 1653). English political writer. Educated at Trinity College, Cambridge, he was a staunch royalist, and suffered much during the civil war. His political treatises, mostly published posthumously, are of an absolutist character, defending the patriarchal theory of the origin of government, and attacking the doctrines of Hobbes, Milton, and others. The most important is *Patriarcha*, published 1680 and to which Lock replied in his *Treatise on Government*. He died May 26, 1653.

**Filmy Fern.** Fern of delicate texture belonging to the genera *Trichomanes*, *Hymenophyllum*, and *Todea*. The leaves are so thin in



Filmy Fern. Leaves of *Hymenophyllum Tunbridgense*

substance that they are more or less pellucid, and lose moisture so rapidly that they are found growing only where the atmosphere is humid. Consequently in cultivation they require to be kept in a closed case. The filmy ferns proper form the genus *Hymenophyllum*, of which *H. tunbridgense* is a well-known European form, with leaves only two or three inches long, growing in matted sheets on moist, shaded rock. The Killarney fern (*Trichomanes radicans*) is a much larger species, with leaves as much as a foot long.

**Filon, PIERRE MARIE AUGUSTIN** (1841-1916). French author. The second son of the historian, Charles Auguste Filon (1800-75), in 1867 he was appointed tutor to the Prince Imperial, only son of Napoleon III, and after the Franco-Prussian War he accompanied the prince to England. He died at Croydon, May 13, 1916.

Besides numerous studies of English life and literature contributed to French reviews, his



voluminous works include Guy Patin, *Sa Vie et Sa Correspondance*, 1862; *Histoire de la Littérature Anglaise*, crowned by the Academy, 1883; *Nos Grand-Pères*, 1887; *Profilis Anglais*, 1893; *Mérimée et ses Amis*, 1894; *Le Théâtre Anglais*, 1896, Eng. trans. F. Whyte, 1897; *Prosper Mérimée*, 1898; *De Dumas à Rostand*, 1898; and *La Caricature en Angleterre*, 1902.

His son, Louis Napoleon George Filon (b. 1875), a mathematician, was appointed professor of mathematics and mechanics in the university of London, 1912. He served in the army and on the air board during the Great War.

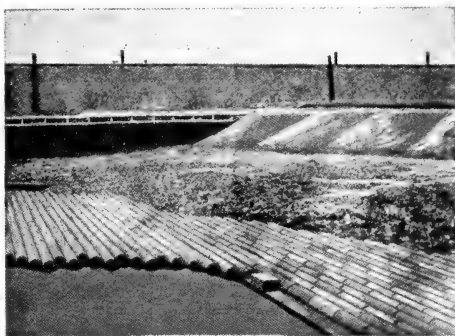
**Filter** (late Lat. *filtrum*, felt). Mechanism designed to act as a very fine strainer and to arrest solid suspended matter, even down to germs and microbes where potable water is in question.

The filter bed ordinarily used by water companies is formed either of bricks or paving slabs laid in cement or, more generally now, of fine concrete finished with a layer of asphalt or bitumen, the aim being to secure a water-tight surface. The floor will not be laid level but will slope a little from the sides towards the middle or to one end, where the arrangements for withdrawing the water will be placed. On this floor will be laid either coarse gravel to a thickness of about 6 ins., or two layers of bricks or pipes, the lower one having the bricks spaced an inch or so apart, and the upper one having them placed close against one another. Upon the latter will be spread fine gravel to the depth of about 6 ins., and over this a mass of clean, sharp sand to a depth of from 2 ft. to 4 ft. This combination of bricks, gravel, and sand constitutes a filter bed. The term is peculiarly appropriate, as no part of this formation may be the real filtering medium, which will be formed usually by the fine deposit which the water itself gradually lays on the surface of the filter bed.

When the filter has been working for some time a film of mud, produced by the life-processes of innumerable bacteria, which destroy organic matter and are an essential feature of the filter, forms on the sand, and the filter is then in its most efficient condition. The rate of filtration should not exceed about one gallon per sq. ft. of bed per hour. In the U.S.A. the mechanical or pressure filter is much used. The water, dosed with a minute proportion of alum, which precipitates clay and organic matter almost instantaneously, is forced through large metal containers al-

most filled with sand. The rate of filtration is up to 100 times higher than that of a gravity filter.

The best forms of household filter are those in which unglazed porcelain or biscuit china is the filtering medium. Microbes



**Filter.** Multiple filters and raw water reservoir at Accra, Gold Coast Colony. Above, filter bed as used in London waterworks, under construction. The three depths of loose pipes, gravel, and sand are visible

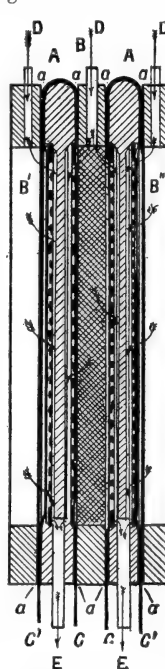
cannot pass through or into such material, and water itself percolates so slowly at low pressure that a filter of this kind should, if possible, be attached directly to a tap connected with the main.

To use a neglected filter may be more dangerous than not using one at all, as a foul filter provides an ideal breeding-place for injurious microbes. See Water Supply.

**Filter Press.** Appliance much used in a variety of industries, including the manufacture of chemicals, dyes, sugar, paints and colours, pottery, yeast, starch, and many pharmaceutical preparations. To some limited extent it is also used in the treatment of sewage.

Its construction and operation are best explained by the aid of a diagram as appended. A, A' are two frames, of cast iron usually, though sometimes they are made of wood and occasionally of special metals—lead, brass, and even gold. These are filter plates. B is a frame corresponding generally to A, A', and prepared so that it may make perfectly water-tight joints with them at a, a, a, a, but with the centre hollow. This is the "cake" plate. A series of these plates, alternating as shown, are placed in a frame which is provided with gear by which all the plates may be pressed tightly up against one another, a "press" being thus constituted. Over each of the filter plates is placed a filter cloth, C, C', or double cloths may be used, one being fine and the other coarse.

and at once fills the whole of the hollow space of the cake plate; the liquid passes through the filter cloth into the grooves on the surface of the filter plate and is led by those grooves into the vent E (con-



**Filter Press.** For explanation see text

The centre of the filter plate is grooved all over on each side, so that the filter cloth lies against or upon the grooved surface. The liquor to be filtered is introduced at D (the position shown is conventional for simplicity of illustration)

tional position) at the bottom of the plate, whence it escapes. As the process goes on the hollow space of the cake plate gradually fills with solid material filtered out of the liquid which has passed through the cloth, until in time this space is closed with a firm, compacted mass through which it is difficult or impossible to force any more liquid. The press is then opened, the plates drawn apart, the "cake" removed, the filter cloths cleaned or replaced

by others, and the press closed up again for a further operation. Not all substances, however, will form a firm cake in the press, and sometimes the solid material must be removed in the form of sludge. A remarkable degree of purity may be obtained in the effluent by the use of this apparatus. In older types of filter press the separate cake plate was not used, and the space for the cake was provided by recessing the centre of the filter plate on each side. There were thus fewer joints, but the more modern arrangement has decided advantages, though it is rather more costly to construct.

It should be noted that sometimes it is the filtered liquor which is the chief object of the process, but in others it is the "cake." Thus in sugar manufacture and refining it is the liquor; in the manufacture of yeast and paints and colours it is the cake.

**Filter Pump.** Term given to the pump used to operate a filter press. The pump is of any good ordinary design, but must be constructed to work against a high pressure, as the filter press cakes formed in the appliance, when they become compacted, offer great resistance to the passage of a liquid through them. This resistance may represent as much as 100 lb. to the square inch or more.

**Fin** (Lat. *penna*, wing, fin). Expansion of the skin or body wall in aquatic animals, by means of which they swim. In the fishes they are of two distinct kinds, paired and unpaired. The former correspond to the limbs in the higher animals, and are connected with bones; the latter, which consist usually of dorsal, anal, and caudal fins, are simply folds of skin more or less supported by fin-rays.

**Fin.** In aeronautics, any fixed subsidiary plane or surface set vertically to the rear part of the fuselage of an aircraft. The fin is generally mounted in front of the rudder, and its purpose is to increase the stability of the machine. A cooling rib of metal formed on the cylinder of an engine is also termed a fin. Its purpose is to facilitate the radiation of heat from the engine and prevent overheating. A fin post is the strut or post to which the stabilising fin of an aeroplane is fixed. See Aeroplane.

**Finale** (Ital., end). Closing movement of a composition of extended character, such as a sonata, symphony, or concerto; or the last portion of one of the acts of an opera, in which as a rule a large force of the performers assembles on the stage. The operatic finale

often consists of several distinct movements, but all leading up to the final ensemble. As the coda is the concluding section of a single movement, so the finale winds up a complete work consisting of several movements. During the past two centuries the coda and finale, from being mere perfunctory endings of little significance, have become an important summing up and climax.

**Finance** (late Lat. *finare*, to pay a fine). Word used for money matters in general, but especially for those of a country, town, or other corporate body. A financier is one who is concerned with money matters, but refers rather to bankers and business men than to the civil servants who manage a country's finances. The finances of each country are part of its system of government and are dealt with as such. See Consols; National Debt; National Finance.

**Finance Act.** Name given to the annual Act of Parliament that legalises the proposals contained in the Budget. The taxes made for the coming year were embodied in a Customs and Inland Revenue Bill until 1894, in which year the scope of the bill was enlarged and its title changed to Finance Bill. In 1899 provisions relating to the National Debt were included therein. See Budget.

**Financial News, THE.** London daily newspaper. Started by H. H. Marks, Jan. 23, 1884, as The Financial and Mining News, it was at first issued only on five days of the week. It initiated the publication in London of daily cables from the New York stock market.

**Financial Times, THE.** London daily newspaper. It was founded in 1888 by G. D. Macrae and F. M. Bridgewater. From the same office are issued an Investor's Guide, Oil Handbook, and Mining Handbook.

**Financier and Bullionist, THE.** London daily newspaper. It was incorporated with The Financial Times in 1924. Its then title dated from 1900, when The Financier, begun in 1870, was amalgamated with The Daily Bullionist, a paper begun in 1866 as The Bullionist and renamed The Daily Bullionist in 1899.

**Finch** (Lat. *Fringilla*). Name applied to a large family of small birds, distributed over most of the temperate zone, except Australasia. They are characterised by hard conical beaks with smooth edges, and have nine primary wingfeathers and twelve feathers in the tail. The nostrils are close together, and there are a few short bristles around the mouth. In all the species the sexes are differently coloured or

marked. Finches are in the main seed-eaters; they are apt to be found in small companies, and they frequent both woods and open country. Among the commoner finches in Great Britain are hawfinch, greenfinch, chaffinch, brambling, goldfinch, siskin, linnet, and house sparrow. See illus. p. 1334.

**Finchley.** Residential district and parish of Greater London. Lying E. of Hendon, N. of Golder's Green, Hampstead and Highgate, and S. of Whetstone and Barnet, it is approached from St. John's Wood by the Finchley Road, from Highgate by the Great North Road,



Finchley. The parish church of St. Mary, restored in 1872

has stations on the G.N.R., and electric tram and motor-bus services. It comprises N. Finchley, E. Finchley, and Church End. Near the Perpendicular parish church of St. Mary, restored in 1872, is Christ College, founded 1857. About 90 acres of what was Finchley Common, once a resort of highwaymen, and the scene of several military encampments, are occupied by the Islington and St. Pancras cemeteries; Marylebone cemetery is between East Finchley and Church End. General Monk mustered his forces here in 1660, and the Guards were assembled here in 1745, an event commemorated in Hogarth's picture, The March to Finchley. An urban district, Finchley gives its name to a co. div. returning one member to Parliament. Pop. 39,419.

**Finck, HERMAN** (b. 1872). British conductor and composer. Born in London, Nov. 4, 1872, he studied at the Guildhall School of Music. In 1900 he was appointed musical director of the Palace Theatre. He has written more than 50 light operas and some hundreds of songs.



Findhorn, Elgin. The fishing village, looking along the sea front towards the west

Valentine

**Findhorn.** River of the counties of Elgin, Nairn, and Inverness, Scotland. It issues from the Monadhliath Mts., and flows N.E. for 62 m. to Moray Firth, which it enters 2 m. N. of Forres through Findhorn Bay. Findhorn, a fishing village and watering-place, is on the E. shore of the bay.

**Findlater, JANE HELEN.** British novelist. Born at Edinburgh, she published her first novel, *The Green*



Jane H. Findlater, British novelist

Elliott & Fry

also wrote several stories in collaboration with her sister, Mary Findlater (*q.v.*), including *Tales That Are Told*, 1901; *Crossriggs*, 1908; *Penny Money*, 1911; *Seven Scots Stories*, 1913; *Content With Flies*, 1916; and *Seen and Heard*, 1916.

**Findlater, MARY** (b. 1865). British novelist. She was born at Lochearnhead, Perthshire, and educated at home. Besides the stories written with her sister, Jane Helen Findlater, her work of fiction included *Over the Hills*, 1897; *Betty Musgrave*, 1899; *A Narrow Way*, 1901; *The Rose of Joy*, 1903; *A Blind Bird's Nest*, 1903; and *Tents of a Night*, 1916.



Mary Findlater, British novelist

After Lady Jane Lindsay

**Findlay.** City of Ohio, U.S.A., the co. seat of Hancock co. On the Blanchard river, 44 m. by rly. S.S.W. of Toledo, it is served by

and shoe, and glove factories. Settled in 1813, it was incorporated in 1837, and chartered as a city in 1890. Pop. 14,858.

**Findlay, GEORGE GILLANDERS** (1849-1919). British scholar. Born Jan. 3, 1849, he was educated at Wesley College, Sheffield, Richmond theological college, and London University. Entering the Wesleyan ministry in 1870, he was assistant tutor at Headingley College, 1870-74, classical tutor at Richmond College, 1874-81, and tutor in exegesis and classics at Headingley, 1881-1917. His writings include commentaries in the *Expositor's Bible* on S. Paul's Epistles, contributions to the *Expositor's Greek Testament*, and the *Cambridge Greek Testament and the Bible for Schools*. He died Nov. 2, 1919.

**Findon.** Village of Kincardineshire, Scotland. It is on the coast, 6 m. S. of Aberdeen. Fishing is carried on, and the village gives its name to the Findon or Finnon hadocks, which were first cured here.

**Fine** (Lat. *finis*, the end). Term common in English law. Originally a sum of money imposed upon someone by way of compounding—i.e. paying to make an end of the matter instead of going to prison or paying in several instalments. By feudal law a leaseholder often pays a fine for the renewal of his lease, and copyholders on change of ownership. But the word is best known in its connexion with criminal offences, being a sum of money imposed by way of penalty for a crime or breach of some law or regulation. As a rule, the amount of fine to be imposed is in the discretion of the judge, subject to the rule of Magna Carta that the fines must not be excessive, a maximum in most cases being fixed by statute.

**Fine Arts.** Term comprehensively embracing all the five greater arts which minister to the love of the beautiful, the intellectual, and the tasteful, viz.: music, poetry,

painting, sculpture, and architecture. Custom, however, has confined the term to the last three particularly, and these again include allied subjects, such as engraving, decoration and design. The French term *Beaux Arts* has a similar significance. See Art; Painting; Sculpture.

**Finedon.** Urban dist. and village of Northamptonshire, England. It is 3 m. N.E. of Wellingborough, on the Mid. Rly. Boot and shoe making is engaged in, and there are iron-ore mines close by. Pop. 3,782.

**Fines and Recoveries.** Legal fiction introduced in England to override an Act of Parliament which was against the public interest. By the statute *De Donis Conditionalibus* (on conditional gifts) in 1285, it was enacted, in effect, that land which was entailed could never be disentailed; so that if an estate were given or left to A in tail, it must always keep in A's family and could never be sold. By this, among other things, the creditors of A, or his heir in tail, could never touch the land for their debts. The judges were strongly opposed to the policy of the barons who had passed this Act, because they thought it against the public interest that land should be made inalienable.

Therefore, from about 1400 they connived at fines and recoveries, which were fictitious actions worked thus. A is the holder in tail of Whitacre. He wishes to disentail, so that he can sell or mortgage, or divide his land amongst his family. An action is brought by X, claiming the land from A, X alleging that the land was his in fee simple (*q.v.*). A, on getting into court, says that the land was granted to him by Q, who was, in fact, the usher of the court; Q was then called upon to come into court and defend his title. Of course Q put in no appearance. Judgement was thus given in favour of X; and X, having recovered the land as a fee simple, promptly re-conveyed it to A as a fee simple, free from the entail. By an Act of 1833 fines and recoveries were abolished. See Fiction, Legal.

**Fingall, EARL OF.** Irish title borne since 1628 by the family of Plunkett. In 1403 Sir Christopher Plunkett, a member of this old family, became by marriage the holder of the barony of Killeen in Meath. This made him an Irish peer, and his descendants sat in the Irish House of Lords until the union of 1800. Lucas, the 10th lord, was made earl of Fingall in 1628, and both he and his son were supporters of Charles I. Peter, the 4th earl, was outlawed after 1689 for adhering to the Stuart cause,

and after his time the title passed to another descendant of the 1st earl. Arthur James, the 8th earl, was made a peer of the United Kingdom in 1831, and in 1881 another Arthur James became the 11th earl. The earl's seat is Killeen Castle, co. Meath, and his eldest son is known as Lord Killeen.

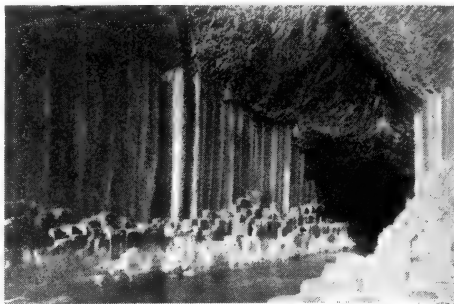
**Fingal's Cave.** Cavern in the island of Staffa, the most notable of its kind. Hollowed out of the basalt, the grotto is 228 ft. long, 48 ft. wide, and 60 ft. high. It is remarkable for its regular basaltic columns, for its wonderful and varying colours revealed as the light plays upon it, and for its stalactites. On the S. of the island, it was discovered by Sir Joseph Banks in 1772. Sea birds live in the cave, which is also noted for the sound made at times by the wind rushing out of it. In Gaelic speech it is called the cave of music.

**Finger.** Terminal member of the hand. The bones or phalanges of the fingers are three in number in each finger, except the thumb, which has only two. The fingers articulate with the metacarpal bones of the palm. Along the backs of the fingers pass the tendons of the extensor muscles, which straighten the fingers, and along the fronts the tendons of the flexor muscles, which close the hand. The blood supply of each finger is derived from two digital

arteries which run along each side of the finger and unite at its extremity. The nerves which supply the skin of the fingers are derived from the ulnar, radial, and median nerves.

Supernumerary fingers are not uncommon. In a case on record there were twelve fingers on one hand and thirteen on the other, and twelve toes on each foot. Absence of one or more fingers, or part of a finger, may also be a congenital deformity, i.e. present at birth. In webbing of the fingers, or syndactylism, a thin web, usually consisting chiefly of skin, unites one or more fingers. Sometimes the bond of union is thick and fleshy. See Anomaly.

**Finger and Toe.** Disease causing malformation of the roots of turnips and other cruciferous crops (cabbage, rape, radishes, etc.). It is also known by the names of club-root and anbury. In a typical specimen the main root will not be fully



Fingal's Cave, Staffa. The pillared entrance to the grotto

developed, but the lateral roots will be much swollen. The cause of the disease is a microscopic fungus (*Plasmidiophora brassicae*), one of a group of organisms (*Mycetozoa*) regarded by many authorities as animals. The disease is highly infectious and difficult to stamp out. It is scarcely known on soils rich in lime, and the best plan of dealing with it is by application of a dressing—2 to 4 tons per acre—of slaked lime, preferably 18 months before the turnip or other crop is to be sown. The remains of diseased plants should be burnt. Judicious rotation is of much importance, and continuous cropping, especially in kitchen gardens, must be avoided.

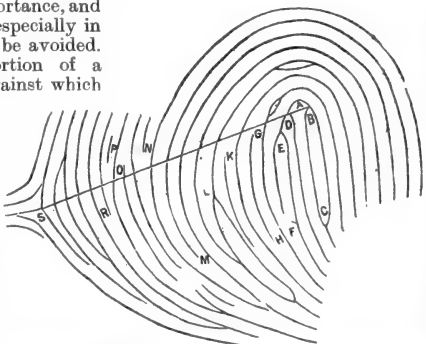
**Fingerboard.** Portion of a stringed instrument against which the fingers press the strings in order to regulate the vibrating lengths of the strings, and so control the pitch of the sounds. Bowed instruments of the violin family have smooth fingerboards on which the player must judge and remember the correct stopping-places; the plucked instruments such as the guitar, mandoline, and banjo usually have frets or cross ridges to assist the player.

**Finger Print.** Impression of the human finger. It is used to classify human beings; but chiefly for the identification of persons who have passed through the hands of the police.

The individuality of finger prints and their value in proving identity were known to the Chinese about 200 B.C., and an impression of the thumb was used in lieu of signature; but it was not till the 19th century that the classification of the ridges on the finger tips was attempted. In 1823, Purkenje, professor of physiology at Breslau,

suggested a system of classification, and in 1858 Sir William Herschel laid the foundations of the present system in Bengal. In 1890 Sir Francis Galton pointed out that ridges on the fingers of a newborn infant were absolutely identical to the day of death.

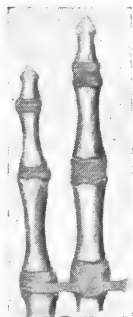
The full value of Purkenje's, Herschel's, and Galton's work was only recognized when Sir Edward



**Finger Print.** Two diagrams illustrating (above) the actual thumb print in blood left by a murderer, and (below) the lines of the ridges of this thumb print drawn to facilitate examination. The letters from A to S indicate the various characteristics which distinguish the print, e.g. L is the bifurcated ridge, S B is the line joining the two terminal points of the print, to enable the number of ridges to be counted and compared with a known finger print of the murderer, who was caught and sentenced on the evidence furnished by these two diagrams

Henry devised a numerical formula for classifying the impressions. The Henry system has been widely adopted by the police organizations of the world, and at New Scotland Yard alone the number of cards registered is a quarter of a million, involving some 2,500,000 finger prints.

During the Great War the system was extensively used as a means of identification by the United States government. Under the American Seaman's Law of 1915 the finger



Finger. Bones of human finger

prints of every sailor in the American merchant marine were taken for classification of able seamen, etc., and the prevention of fraud, while in the war department finger print records were kept of every soldier. It has been shown that the chance of identity of two finger prints is less than one in sixty-four thousand millions, and the prints of one finger, therefore, are enough to decide the question of identity. If, as is customary, the prints of three or more fingers are taken the possibilities of error are entirely eliminated.

All finger print impressions are divided into two groups of four types and eight distinct patterns, such as loops, arches, etc. The ten fingers in the Henry system are divided into five pairs, and by a special way of numbering these pairs the classification of a particular finger print is made simple. See Scotland Yard.

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**Fingo** OR AMAFENGU (Zulu, wanderers). Collective name for Bantu-speaking peoples of Kaffir stock whose tribal unity was destroyed by the Zulus under Chaka. In 1835 the Cape government gave them asylum near the Great Fish river; this Fingoland reserve became, in 1877, one of the Transkei districts. Always friendly to the British, they have become largely Europeanised and Christianised, with a high educational standard. They furnish labour contingents for the harbours and mines.

**Finial** (Lat. *finis*, end). In architecture, a foliated ornament capping a pinnacle, gable, or stair-post. Occasionally the finials of

shop of the Pollaiuoli. He is stated by Vasari to have invented engraving on metal, but he was only one of the pioneers in this craft, which he practised together with niello work, of which he was a master. Intarsias by him are to be seen in the sacristy and the cathedral museum, Florence; his prints and drawings are in the Uffizi gallery and the British Museum. There has been much controversy as to his alleged invention of engraving.

**Fining** (Lat. *finis*, end). Process by which liquids are freed of solid matter and impurities, and thus clarified. Though somewhat akin to filtering, it is used in a special sense in the brewing and distilling industries, various substances such as isinglass, sulphate of lime, etc., being employed to collect and carry off the matter in solution, leaving the liquid bright and clear. In fining syrups white of egg may be used, the albumen being dissolved by heat. Wines are similarly fined without the application of heat, the alcohol acting as the solvent. (See Brewing; Distilling.) Fining is also a process in glass-making, and was used in the production of malleable iron before the introduction of puddling.

## FINLAND: THE LAND AND ITS PEOPLE

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*This article describes the country of the Finns and deals also with its language, literature, history, etc. See also Finns; Russia; Sweden; and articles on Abo; Helsingfors, and other places in the land*

This republic of N. Europe lies between Russia on the E., Sweden and the Gulf of Bothnia on the W., Norway on the N., and the Gulf of Finland on the S. The country has an area of 144,253 sq. m. Helsingfors is the capital.

Its coast-line, which is entirely on the Baltic, is 1,000 m. long, low-lying, highly indented, and fringed with islands of which the Aaland Islands in the S.W. are the most important. The country consists of a great plateau, at an elevation of 300 to 500 ft., with lowlands round the

ern part of the country is known as Lapland and is inhabited by the nomad race of Lapps.

Of Finnish lakes the largest are Saima, 502 sq. m.; Inari, 534 sq. m.; Paijane, 429; and Uleastrak, 387. Half

of Lake Ladoga (7,000 sq. m.) is Finnish and half Russian. There are numerous short rivers which are broken by rapids, and are navigable only in stretches, but are useful for floating timber. Finland has a short, hot summer and a long, cold winter. Rainfall is not heavy, and there is comparatively little snow, but it lies on the ground from Oct. to March. Rivers and lakes are frozen from Dec. to May. Abo, Hango, and Helsingfors are the only ports open in winter. Coniferous forests cover 60 p.c. of the country. Wild animals include reindeer, bear, wolf, and lynx. Mosquitoes are a plague. The population numbers 3,329,401, and is found mainly in the S. and along the W. coast. In the days of



Finial. 1 and 2. From Canterbury Cathedral. 3. Norwich Cathedral. 4. Lady Chapel, Winchester Cathedral

stair-posts themselves acted as supports for statuary, as those at Cromwell House, Highgate, where they are surmounted by Round-head figures.

**Finiguerra**, MASO (c. 1426-64). Italian goldsmith and engraver. Born probably at Florence, details of his life are uncertain. He was trained as a goldsmith in the work-



Finland arms





Finland. Map of the North European republics, formerly part of the Russian Empire

Russia's rule there was much emigration to America. Finns, either Tavastlanders or Karelians, form 90 p.c., and Swedes about 9.5 p.c. of the population. There are a few thousand Lapps in the North.

The language is Finnish, but Swedish is understood in the larger towns and is the language of the Åland Islands. Swedish was for long the official as well as the literary language. Finnish literature may be said to have begun in 1835, when Elias Lönnrot collected and published in Finnish the traditions and folklore of Finland as expressed in its national songs. This epic of Finland, the Kalevala, was later revised and extended, and in 1888 translated into English. The Finnish Literary Society has done much to revive Finnish as a literary language, although many Finnish books are mere translations from Swedish and other tongues.

#### Writers and Explorers

Among Finnish writers may be mentioned A. Stenvall, dramatist and poet; M. Canth, dramatist; P. Päivrinta, noted for the work entitled *His Life*; and J. Aho. Finnish novels and plays are frequently grim and realistic, but often show much simplicity and tenderness

of self-government, but was an integral part of the Scandinavian kingdom. Early in the 18th century Russia began to pay attention to Finland, and by the treaty of Nydast (1721) secured the province of Viborg. Sweden unsuccessfully tried to recover the lost province in 1741, and the Russian sphere was extended.

In 1809, after years of fighting, Sweden finally withdrew from Finland, the whole of which, with the Åland Islands, passed to the grand duchy under the tsar Alexander I, who guaranteed the Finn constitution and became grand duke. For many years the relations between Russia and Finland were cordial and Finland prospered. Successive tsars respected the Finnish constitution and the right of Finland to settle her own affairs. Gradually, however, a Finnish national party arose whose first object was to put Finnish on the same standing as Swedish as the official language of the country. They succeeded in doing this in 1863, in face of the opposition of the Swedish element.

Meanwhile the reactionary party in Russia tried to exert its influence against the Finnish national party, and for the next 50 years succeeded

in oppressing Finland. They largely reflect the hardships of the Finnish peasant's life. Literary and scientific societies are active in Finland, particularly in the study of the home country. Several Finns, including A. E. Nordenskjöld, the discoverer of the north-east passage, have been distinguished in Arctic exploration. Finnish painters include E. Järnefelt and A. Gallen.

**HISTORY.** The Finns reached Finland from their Asiatic home in the 7th and 8th centuries. In the 12th century Sweden began to get a hold on the country, and established Christianity. Gradually Swedish influence spread round the coasts, and by the 16th century Finland was raised to a grand duchy which had a large measure

of thought. They largely reflect the hardships of the Finnish peasant's life. Literary and scientific societies are active in Finland, particularly in the study of the home country. Several Finns, including A. E. Nordenskjöld, the discoverer of the north-east passage, have been distinguished in Arctic exploration. Finnish painters include E. Järnefelt and A. Gallen.

#### The Great War

At the outbreak of the Great War coercive measures increased, with the result that the Finns, distrustful of Russia's allies, sympathized with the Germans. The Russian revolution of March, 1917, restored freedom to Finland, which declared itself a republic within Russia. After the Bolshevik revolution, Nov., 1917, Finland declared her independence and civil war spread to the country. The White, or constitutional, party, failing to get help in arms and food from Britain and Sweden, turned to Germany for help against the Reds and Bolsheviks. A German force landed and subdued the Red forces. The Germans, after making a treaty with Finland, almost wholly to their advantage, tried to foist a German prince on the Finnish throne, but their collapse in Nov., 1918, put an end to the scheme. In Oct., 1920, a state of war continued between Finland and Soviet Russia, without actual hostilities. Finland demanded from the former the port of Petschenga, the province of Karelia, and certain islands in the gulf of Finland.

Finland then became an independent republic recognized by all the powers. Government is by two houses, senate and diet. The diet is elected by all men and women over 24. Women are eligible. After the declaration of independence a conscript army was raised. There is no navy. Education is good except in remote parts where the population is too scattered for the children to attend school. About a third of the population is said to be unable to write. There are several high schools, technical schools, and agricultural colleges. The University of Helsingfors has about 3,500 students, among whom are a large proportion of women.

About 90 p.c. of the population belong to the Lutheran Church. There are a few adherents of the Greek Church, and a small number of Roman Catholics. There is an archbishop of Abo, and bishops of Borga, Nyslott, and Kuopio. Of



Finland. A typical Finnish family

late the Church has lost influence with the advance of socialism, now to be reckoned as one of the greatest forces in the country, with a majority in the diet.

Finnish peasants live simply, and their food is poor, but, except in the N. and E., there is little real poverty. The bath house attached to every farm is characteristic of the country. The Swedish element of the population is found in the towns, where until recently they formed the wealthy commercial classes. The Finns now are well represented among the more prosperous classes in the towns. Local veto and strict regulations on the sale of alcohol have made the Finns a sober nation. The organization of public wealth and preventive measures, particularly against cholera, are well developed.

**INDUSTRIES.** Oats, barley, and rye are the chief crops, and potatoes are important. A little flax is grown. Numbers of cattle are kept for dairy purposes. Minerals are few and of small importance. Manufactures are well developed, mainly by help of water power. They include engineering, machine and shipbuilding, pulp and paper-making, cotton goods and tanning. Saw-mills number about 1,000. The chief ports are Helsingfors, Hango, Abo, Kotka, Viborg, and Uleaborg. The main exports are timber, butter, paper, pulp, and textiles, and the imports include

cereals and other foods, cotton, machinery, and coal. Much inland traffic is by water, but roads, in the S., are numerous and well made. The southern half of the country is well served by rlys., which are linked with those of Russia and meet those of Sweden. The gauge is chiefly 5 ft.; the mileage in 1914 was 2,500 m. Most rlys. are state-owned. A rly. through Lapland to the Arctic Ocean is being built. The telegraph and telephone systems are well developed.

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**Finland, GULF OF.** Eastern arm of the Baltic Sea, between Finland and Estonia. It is studded with islands. Several important towns are on the coast—Petrograd, Helsingfors, Viborg, and Reval. Its length is 250 m. and its average breadth 60 m.

**Finlay, ROBERT BANNATYNE FINLAY,** 1st VISCOUNT (b. 1842). British lawyer and politician. Born July 11, 1842, he was educated at Edinburgh academy and university. He qualified as a doctor, but became a barrister in 1867. Success quickly came to him, and, assured of a good practice, he sat in Parliament as Liberal M.P. for Inverness Burghs from 1885-92, and from 1895-1906. From 1910-16 he represented the universities of Edin-

burgh and St. Andrews, having been since 1886 a strong Unionist. From 1895-1900 Finlay served as solicitor-general, and from 1900-6 as attorney-general. He became lord chancellor in the Government formed by Lloyd George in Dec., 1916, retiring in Dec., 1918. On his appointment he was made a baron, and a viscount in 1919. He was appointed British member of the permanent court of arbitration at the Hague, in 1920, and was lord rector of Edinburgh University, 1902-3.

**Finlay, GEORGE** (1799-1875). British historian. Born at Faversham, Dec. 21, 1799, he was educated at the universities of Glasgow and Göttingen. He espoused the cause of Greek independence, saw much of Byron at Missolonghi, and finally made Greece his home, never visiting England after 1854. His great work, *A History of Greece from the Conquest by the Romans to the Present Time*, was published complete in 1877, its main parts having previously appeared in 1844, 1856, and 1861. Among the other writings of Finlay, who had a clear if not picturesque style, were articles in *Blackwood's Magazine*, *The Athenaeum* and *The Times*, and studies of classical geography, published in German, 1844. He died at Athens, Jan. 26, 1875.

**Finnmark.** Maritime fylker or county of N. Norway. It is bounded N. by the Arctic Ocean and S. by Lapland, and is the northernmost portion of the European land mass, culminating in the North Cape. Area, 18,535 sq. m. Its rugged coast is indented by bays and fiords fringed by numerous islands. The surface is elevated, rising to over 3,000 ft. in parts. Fishing and reindeer-breeding are the chief occupations. Hammerfest (*q.v.*) is the chief town. Pop. 44,777, mostly dwelling on or near the coast. Nomad Lapps occupy the interior.

**Finn, FIONN, FIND, or FINGAL.** Warrior hero of Celtic tradition. The legends which gather round his name have almost certainly a real historical figure behind them. Finn was the son of Cumhal (*pron. cool*) of Leinster and Morna of the White Hand, and was born after his father's death in battle at Cnucha; first called Demne, he came to be called Finn, the Fair One, from his appearance. He took over the leadership of the warrior band known as the Fians or Fianna from his life-long enemy Goll MacMurna. His sons Oisín and Feargus, his grandson Oscar, his herald Ullín, his favourite hound Bran, were famous figures in his story. One of the chief episodes in his career was the



Viscount Finlay,  
British lawyer  
Russell

pursuit of Diarmid, who eloped with Grania, Finn's betrothed.

In Scottish legends Finn is known as Fingal, and was king of Morven, in Argyll. He was slain in the great defeat of the Fians at Gabra, probably in 283. His memory has never faded among the Gaelic peoples of Ireland and Scotland. See Gaelic Language and Literature; consult also Finn and His Companions, S. J. O'Grady, 1892; Gods and Fighting Men, Lady Gregory, 1910.

**Finnesburg.** THE FIGHT AT. Fragment of heroic Anglo-Saxon poetry, discovered in the binding of a MS. in Lambeth Palace library in the 16th century. It describes incidents of the battle between the Frisian chieftain Finn and the Danes.

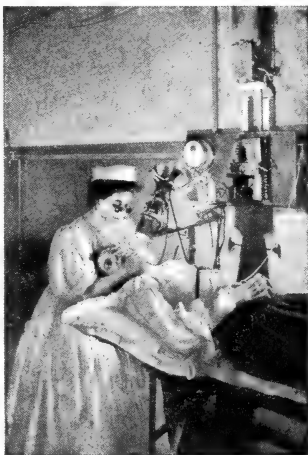
**Finns.** Name denoting in general a people inhabiting central and northern Russia before the Slavonic dispersion. At first a medium-headed race of hunters and fishers, akin to the tall, blond, blue-eyed Nordic type, they mingled in the course of centuries with Alpine rather than Mongolian elements, and are now classifiable mainly by their dialects. These form, with the Ugrian, a branch of the Ural-Altaic family, out of which Aryan probably emerged. Numbering about 6,000,000, they are grouped as Volga, Permian (Votyak), and Baltic Finns. Of the last group the true Finns (Suomi), in Finland and contiguous territories, number 2,600,000. These, having absorbed Swedish influences of race, culture, and speech, display a progressive civilization, a high intellectual attainment, and a passionate love of country. See Finland; Mordvin.

• **Finsbury.** London parl. and met. borough. Bounded S. by the City, it has the boroughs of Islington on the N., Shoreditch E., and Holborn and St. Pancras W. At one time a manor or lordship, forming one of the prebends of St. Paul's Cathedral, N. of Moorfields, and known as Fensbury, from the swampy nature of the ground, its old fields were practising grounds for military and archers, referred to by Shakespeare and Ben Jonson. Here, in 1548, the Protector Somerset was met by the lord mayor on his return from Scotland. Finsbury was once a residential quarter for doctors and surgeons, and it includes Clerkenwell, a clock and watch making centre. Within its area are included the Charterhouse, the headquarters of the H.A.C., Bunhill Fields, Northampton Institute, and St. John's Gate. Finsbury returns one member to Parliament. Pop. 87,923.

**Finsbury Park.** Recreation ground of N. London, the name of which is applied to the district immediately surrounding it. Just outside the county boundary, it occupies 115 acres between the G.N.R. main line and the N. continuation of Seven Sisters Road and the Green Lanes. On the site of old Hornsey Wood House, it was opened by the metropolitan board of works in Aug., 1869, the land costing £56,869 and the laying out about £50,000. It owes its name to the fact that it was planned to serve as a public park for the borough of Finsbury, which reached as far as its S. border. Part of it is intersected by the New River. Adjoining are stations of the G.N., G.N. & City, and G.N., Piccadilly & Brompton Rlys. In 1920 a project was mooted for a tube rly.

from Finsbury Park to the Crystal Palace.

**Finsbury Pavement.** London thoroughfare. It ran N. from London Wall to Finsbury Square, with Finsbury Circus and South Place on its E. side. Finsbury Pavement and Moor-gate Street were incorporated, 1922, as Moor-gate. In Finsbury Circus, in the old home of the London Institution, is the School of Oriental Studies, opened in 1917. In South Place is South Place Institute, a well-known centre of the Ethical Society. See illus. p. 546.



Finsen Light Patient under treatment in the London Hospital

**Finsen Light.** Form of treatment for lupus, invented by the Danish scientist Niels Ryberg Finsen (1860-1904). The rays from a powerful electric arc lamp are passed into an absorbent medium which allows only the actinic or chemically active rays to pass through it. These rays, having been concentrated by means of lenses of rock crystal and cooled by being passed through a continuous current of cold water, are directed on to the affected area. The application is usually continued for an hour.

**Finsteraarhorn.** Mt. of Switzerland, between the cantons of Berne and Valais. It is the highest peak of the Bernese Oberland (alt. 14,025 ft.) and extremely difficult of ascent. The summit was first reached in 1812. The Schreckhorn lies to the N. and the Jungfrau to the W.

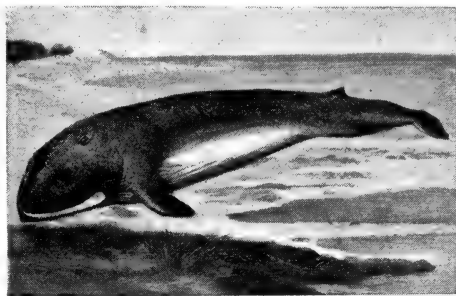


Finsteraarhorn, Switzerland, and the Aletsch glacier, seen from the air

**Finsterwalde.** Town of Brandenburg, Prussia. It is 40 m. N. of Dresden and 70 m. by rly. S.E. of Berlin. It has several iron-foundries; agricultural and other machinery is manufactured here, and coal is procured in considerable quantities in the near neighbourhood. Pop. 13,100.

**Fin-whale** OR FIN-BACK (*Balaenoptera*). Name sometimes given to the rorqual, a common and widely distributed whale, of which four species are usually recognized. As their yield of blubber is small and their whalebone of inferior quality, they are not in great demand; this doubtless accounts for their being still found in great numbers in nearly every sea except near the Poles. They are of somewhat slender form, and have a short back fin, and narrow and pointed flippers. They have a large pouch in the throat for the reception of the fish on which they feed; and when this pouch is collapsed the skin of the throat lies in folds which are characteristic of the genus.

All four species are included in the British fauna. The common



Fin-whale. Stranded specimen of rorqual, *Balaenoptera musculus*

rorqual (*B. musculus*) is often met with in the English and Irish Channels and is frequently cast up on the coasts. Sibbald's rorqual (*B. Sibbaldi*) is the largest of all whales, often exceeding 80 ft. in length. It is abundant in the North Sea, and occurs occasionally around the Hebrides. Rudolph's rorqual (*B. borealis*) is much smaller, and during recent years has been found around the E. and S.E. coasts of England. The lesser rorqual (*B. rostrata*) is about 30 ft. in length, and is fairly common around all the British coasts. See Whale.

**Fiord** (Scand.). Type of inlet found on the coasts of regions which have been greatly glaciated. During the ice age great glaciers scooped out deep trough-like valleys with precipitous sides, and the disappearance of the glaciers admitted the sea. A fiord is usually very deep except near the entrance, and in some cases subsidence of the land has added to its size. Fiord coasts are found in British Columbia, Scotland, and Norway.

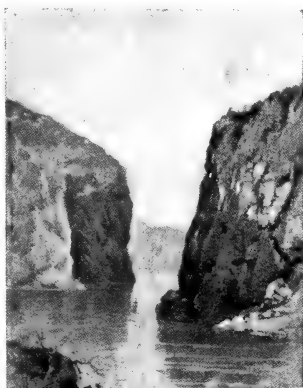
**Fir.** Cone-bearing tree of the natural order Coniferae, and genera *Abies*, *Picea*, and *Pinus*. A native of Britain, N. Europe, N. America, Japan, and the Himalayas, its height varies from 10 ft. to 200 ft. In gardens firs are best grown as specimen trees on lawns, where



Fir. Foliage of silver fir, *Abies pectinata*

their beauty can be fully appreciated. They thrive in any deep, rich loam, may be planted in autumn or spring, and are propagated by seeds sown in a cold frame in spring. Much confusion in nomenclature exists among these conifers, but it is now generally accepted that the true fir means *Abies*, the silver fir. The genus *Picea* embraces the spruces, and *Pinus* the pines. Their cultivation in large quantities for timber is a branch of forestry (*q.v.*). See illus. p. 1287.

**Firbolg.** Legendary name of an early Irish race, usually said to mean bag-men. Some ethnologists employ it to denote the aboriginal



people, mainly composed of dark-haired, long-headed non-Aryan Iberians, who were subdued by the Milesians, a wave of Goidelic Celts that may have crossed from Great Britain. See Milesian.

**Firdausi** OR FERDUSI (c. 940-1020). Pen-name

of Abū'l Kásim Mansúr, Persian poet, called the Homer of the East. He was born at Schadab, near Tús, Khorassan, son of a small landowner. Carefully educated and an apt scholar, he is famous as the author of the Sháh-Námeh, or Book of Kings, a metrical history of Persia from early times to A.D. 641; and Yúsuf u Zulikhá, a poem

on Joseph and Potiphar's wife. The first-named work, in 60,000 couplets, was commissioned by Mahmúd, sultan of Ghazni, who promised 60,000 gold pieces as a reward. Firdausi, however, excited the enmity of Mahmúd's vizier, and when, at the end of his task, which occupied him for 30 years, the vizier sent him pieces of silver instead of gold, the indignant poet divided the money between the keeper of a bath, a sherbet seller, and the vizier's messenger, penned a flaming satire on Mahmúd, and, after spending the remainder of his life a proscribed man, died at Tús. According to legend, as his body was being borne to the grave, a messenger laden with 60,000 gold dinars from Mahmúd arrived, and, as Firdausi's daughter refused the money, it was spent on some much-needed public buildings in Tús.

The Sháh-Námeh, which has been described as the Iliad of Persia, is characterised by its Persian vocabulary, the simplicity of its style, its high qualities of invention, its original transcripts from nature, its patriotism, its dramatic dialogues, and its reflection of the author's Zoroastrian faith. Battles, combats, feasts, scenes of riot, and carnage alternate with pictures of innocence and peace. Much is taken up with the wars of Persians and Tartars, and one of the central characters is Rustum, the Persian Hercules, who unwittingly kills his own son, an episode familiar to modern readers in Matthew Arnold's poem, Sohrab and Rustum.

**Bibliography.** Poems of F., Eng. trans. by J. Champion, 1785; Sháh-Námeh, trans. and abridged, J. Atkinson, 1832, new ed. 1892; Sooh-



Fiord. View in the Naero Fiord, Norway; above, typical cliff-walls of a fiord

rab, a free trans., J. Atkinson, 2nd ed. 1828; Episodes from the Sháh-Námeh, trans. into English verse, S. Weston, 1815; Biographical Notices of Persian Poets, Gore Ouseley, 1846; Sháh-Námeh, the orig. text, with French trans. in prose, J. Mohl, 1876-78; The Epic of Kings, H. Zimmern, 1886; Literary History of Persia, E. G. Browne, 1902-6; Yúsuf and Zulikhá, ed. H. Ethé, 1908.

**Fire** (A.S. *fyrr*). Word embracing in its widest sense any manifestation of glowing heat. It commonly denotes the visible effect of the combustion of substances by means of the chemical combination of atmospheric oxygen with one or more of their constituents, the incombustible residue being called ash. Flame is formed when glowing gas is produced, either as a primary or as a secondary result of the burning. There may also be non-luminous vapours called smoke or fume.

The process of raising the temperature of combustible or inflammable substances to the point at which self-sustaining combustion proceeds is called ignition. This may be brought about by solar radiation, terrestrial heat, molecular action, electrical discharge, friction, pressure or percussion. Fire may be extinguished before combustion is completed by reducing the temperature of the burning mass below the ignition point, or by stopping the access of air. In the domestic and industrial arts heat and light are commonly obtained from substances—solid, liquid, or gaseous—which are called fuels, mostly derived from carbonaceous materials of vegetable origin.

Primeval man first encountered fire as a natural manifestation, which he came to regard as an all-devouring spirit to be feared and shunned. Ages may have elapsed before the recognition of fire as a physical fact was followed by any attempt to control it, and then to turn it to account, at first perhaps as a defence against wild beasts. The next advance consisted in devising means for its preservation, an achievement which furnished a potent incentive to a sedentary habit of life. Out of this arose the customs concerned with its perpetuation, sanctity, and worship. During this period of prehistory were laid the foundations of the use of fire for warming the person, cooking food, hardening implements and utensils, and producing artificial light. Fire-making, the artificial production of fire at will, which followed in due time, facilitated nomadism and migration, and was destined to become man's mightiest auxiliary in the conquest of the globe.

From the primitive notion of an all-devouring spirit ancient philosophy advanced to the conception of fire as a thing stolen from heaven, as in the Prometheus myth, and then to the view, attributed to Heraclitus (c. 500 B.C.), that the universe was evolved from an omnipotent fire-god. Medieval alchemy pictured the world as com-

posed of four elements: fire, water, earth, and air. When modern chemistry began, Boyle (1626-91), while still holding fire to be a material element, discovered that air is essential to combustion. A theory propounded by Stahl (1660-1734), that combustible bodies contain a substance called phlogiston, which is released by their decomposition, was not exploded until Lavoisier (1743-94), after discovering oxygen, explained burning as caused by this gas being extracted from air and joined to other substances.

Man is still confronted, as at the beginning, by fire in its destructive aspects. Sometimes they are released intentionally, as by the wasteful agricultural methods practised by jungle-burning tribes in India. Sometimes property is fired maliciously, a felony punishable in England as arson and in Scotland as fire-raising. More evil, however, is wrought by thoughtless or unintentional incendiarism, or by the operation of such causes as spontaneous combustion. Out of these perils have arisen the organized services concerned with fire precaution, proofing, prevention, extinction, and insurance. The Great Fire (*q.v.*) of London in 1666 was one of the greatest conflagrations on record. Since then still costlier conflagrations have occurred in Moscow, 1812; Paris, 1871; Chicago, 1871; Boston, 1872; Baltimore, 1904; San Francisco, 1906; and Salonica, 1917.

**Fire Alarm.** Mechanism for making known the fact that a fire has broken out. An electric fire alarm is a device which automatically closes an electric bell circuit when the air in its neighbourhood attains a high temperature such as would be due to an outbreak of fire. The expansion of matter by heat is the principle used in fire alarms of all kinds. The mercurial type consists of a thermometer with platinum wires entering the bulb and the top of the tube through fused joints. When the mercury rises to a certain height it completes the circuit of which the wires form part, and a bell rings. An adjustable form has the top of the tube open and a sliding upper wire.

Pneumatic alarms are operated by the expansion of air in a closed tube or vessel, and the pressing out of a diaphragm which brings a moving contact against a fixed contact. One variety has a bowl-shaped container with a concentrically corrugated top. The chamber is partly exhausted and then sealed. An alarm is given if the air inside be expanded by heat, or the chamber leaks and the

vacuum is broken, as in either case the diaphragm bulges outwards. In another variety air at atmospheric pressure is contained in a small chamber and in very fine tubes running from it round the walls of the apartments it protects. The air in the tubes is heated quickly by a fire and communicates its pressure to the main chamber.

Metallic fire-alarm contacts employ two metals of unequal expansibility. A common form consists of a bar, compounded of a strip of steel and a strip of copper welded together, or otherwise rigidly joined, fixed at one end and free to move at the other. When the bar is heated the copper expands more than the steel, and the bar curves towards the steel side, bringing the free end against a contact.

The May-Otway alarm has a horizontal steel bar several feet long, to the ends of which the extremities of a piece of copper wire are fastened. A contact-piece hangs from the centre of the wire. The bar and the wire form together a very obtuse-angled triangle. If the temperature rises slowly—on a hot day, for example—the steel bar takes in heat as fast as the copper wire and their relative lengths are changed but slightly, whereas a sudden influx of heat affects the wire much more quickly than the bar, and the wire droops sufficiently to let its contact-piece touch a contact below. This quality of discrimination is imparted in various ways to several other kinds of automatic alarms.

**Fire-arm.** Generic designation of weapons which throw a missile by virtue of the propellant power generated by a charge of suitable explosive. While popular use is inclined to restrict the term to such weapons as can conveniently be used by hand, such as rifles, sporting guns, and pistols, these are more correctly termed small-arms (*q.v.*), and fire-arms includes even the largest artillery.

The history of fire-arms is, naturally, closely associated with that of explosives; but there is no doubt that in early times progress was far more dependent on the smith than the powder-maker, as the latter was always in a position to supply a more powerful explosive than the contemporary guns could employ with safety. The invention of fire-arms is usually ascribed to a German monk, Berthold Schwarz, but the date is not definitely known. From illustrations and accounts in contemporary manuscripts, it is evident that guns were in use by 1320, and the English used them at Crécy, 1346.



These were both bottle-shaped and tubular in form, and at first were employed to fire darts with either metal vanes or a leather pad in place of feathers, but spherical shot were early introduced, being usually made of stone, as the guns would not withstand the charge necessary to propel the heavier metal missiles.

#### Early Developments

The early guns were generally built up of wrought-iron strips welded together, but some consisted of wooden staves bound with iron, and all were valued far more for the moral effect occasioned by the noise of their discharge than for the material damage caused. "Hand guns," which appear to have come in use about 1400, were merely smaller sizes of cannon mounted on a rough wooden stock, and all weapons were discharged by applying a piece of smouldering match to the touch hole.

The next improvement was the invention of the matchlock about 1460, and it was not until the invention of the flint lock early in the 17th century that they were generally superseded. Flint locks remained supreme until early in the 19th century, when percussion caps were introduced. During this time the only improvement in cannon was better construction, and they were cast in bronze in the 15th century and in iron by the 18th, enabling more powerful charges and heavier missiles to be fired, while larger weapons could be constructed. The advent of the wheel lock (*q.v.*) in 1515 had also made it possible to produce a practicable pistol, so that three distinct varieties of firearm, cannon, musket, and pistol, were in existence.

In order to increase the accuracy of weapons, rifled barrels were introduced about 1520, probably by August Kotter of Nuremberg, but the slowness of loading from the muzzle end with this type of weapon restricted its use to sporting weapons until the end of the 18th century, when a few regiments of marksmen were formed, but it was not until breechloaders were definitely established that the rifle superseded the musket.

Breechloading guns have been known for many years. Henry VIII had a sporting weapon of this type, but the Prussian needle gun of 1841 was the first weapon in which the principle was applied with any real success. With a view to increasing the rapidity of fire, double-barrel guns were introduced about the middle of the 17th century, and magazine rifles about 200 years later, one of the earliest being the Winchester of

1867. Revolvers date from 1835, when Colt developed a successful type.

Since 1880 progress has been most rapid, improved construction and the advent of smokeless powder enabling weapons of great power and extreme accuracy to be constructed; improved breech blocks and the absorption of the recoil by hydraulic buffers have revolutionised artillery practice; the employment of the force of the recoil to reload, cock, and fire the weapon enables machine guns to fire at the rate of 600 shots per minute.

Developments in firearms during the Great War were chiefly in the employment of larger guns and howitzers as mobile equipment; in the use of guns of immense power as instanced by anti-aircraft artillery and the German gun having a range of 80 miles, which threw 9.1-in. shell, weighing about 3 cwt. each, into Paris; the introduction of new types of ammunition; and the use of trench mortars, which were essentially extremely light cannon, generally smooth-bored and often muzzle-loading, which were capable of firing heavy projectiles to short and medium ranges.

#### Firearms Act, 1920

In Great Britain everyone who wishes to use or carry a firearm, except when the latter is solely employed for the destruction of vermin or is used in the course of military duty, is required to take out a licence, which costs 10s. In addition the Firearms Act of 1920 requires that everyone in possession of a pistol, revolver, or rifle after Nov. 1, 1920, shall obtain from the chief officer of police in the district in which he usually resides, a permit authorising him to keep such weapon or weapons and the ammunition for them. Particulars (such as maker and number) sufficient to identify the weapons have to be recorded. Permits are not required for military equipment if the owner is a member of the forces, or smooth-bore weapons such as sporting shot guns, nor for antiques, curiosities, trophies of war, etc., but in the latter cases no ammunition suitable for the weapons must be kept. *See* Ammunition; Arquebus; Breech Block; Bullet; Cartridge; Explosives; Ordnance; Pistol; Revolver; Rifle; Trench Mortar.

**Fireback.** Back wall of a fireplace, introduced about the middle of the 16th century as a protection for the walls. Firebacks were of cast iron, often elaborately decorated with designs of flowers, figures, etc., in high or low relief. The most interesting series were those with coats of arms and other heraldic devices, with inscriptions.

**Fireball.** Obsolete military term employed to designate certain early types of projectiles, thrown from mortars for incendiary and illuminating effects. They consisted of a hoop iron frame covered with canvas and filled with composition. The term is occasionally applied to the early fireworks used in warfare by the ancients. It is also used to describe an electrical phenomenon occurring during thunderstorms. *See* Lightning.

**Firebox.** Steel, copper, or wrought-iron box adjoining a boiler, in which fuel is burnt for generating steam in the boiler. A firebox is fitted internally with an arch of firebricks so arranged as to check an undue escape of heat through the boiler tubes and to prevent the passage of solid material through them. In a locomotive boiler a water space is provided over the top of the firebox, and for the full depth on each side and in front so as to present as great a heating surface as possible.

**Firebrick.** Bricks intended for use in the building of structures which are to be exposed to high temperatures, particularly furnaces for the melting of metals. They are made of various materials all of a highly refractory character, according to the particular purpose for which they are intended. Common firebricks are made from special clays; while other materials used comprise ganister, a sandstone with just sufficient clay to permit the ground material to be moulded; Dinas rock, flints, and other siliceous sands and stone; lime; magnesia; graphite; chromite, an iron ore containing chrome; "bull-dog," a mixture of iron oxide and silica used for lining puddling furnaces; and some other special compounds. *See* Brickmaking; Furnace.

**Fire Brigade.** Organization for combating outbreaks of fire. There apparently existed fire brigades in Egypt 4,000 years ago; while a very elaborate organization was already in operation in Rome by 40 B.C. Early in the Christian era hose pipes appear to have been in use. In England we owe the development of the fire brigade to the early fire insurance companies, though an Act of Parliament of 1774 obliged the churchwardens of all the London parishes to maintain a proper engine for putting out fires in their own boundaries. In their own interests the insurance companies organized very complete brigades and equipped them with the best appliances available. The members at first were composed of their own clerks and other officials.

In 1833 the London insurance companies combined, and formed the London fire brigade under the command of James Braidwood, who built the first steam fire engine and was killed while at a fire near London Bridge in 1861. In 1866 the Metropolitan Board of Works took over the entire London organization, which in 1918, under the L.C.C., comprised 79 land stations, 3 river stations, and 6 ambulance stations, with 75 motor fire engines, 81 motor fire escapes, 5 motor hose tenders, 8 horsed fire engines, 18 horsed fire escapes, 4 electrically driven turntable ladders, 19 long ladders, 9 motor ambulance vans, 16 motor cars, 4 fire floats on the river and 4 steam engines on rafts, 60 miles of fire hose, and 1,582 street fire alarms. The personnel comprised 1,297 firemen and drivers and 58 ambulance attendants, with three principal and one chief officer. The horsed turn-out was abolished in 1921.

All important cities and towns now maintain more or less efficient fire brigades, though the number, character, organization, and equipment of the units of the brigades vary considerably. In the larger cities and towns they are composed of paid officials, while in the smaller ones voluntary workers usually man the brigade.

**Fireclay.** Material so called from the high refractoriness of the articles made from it, i.e. its quality (when manufactured) of resisting intense heat, and its freedom from splitting when exposed to rapid changes of temperature. The determining factor of the refractoriness is the chemical composition of the clay, which contains but small quantities of fluxing impurities (such as iron, lime, magnesia, alkalis), and very little free silica. A "proximate" analysis of a typical Scottish fireclay shows the following percentages: Clay substance, 85.42; quartz, 13.42; feldspar, 1.16. Fireclays should dry and fire without cracking and have an open texture to resist alternate heating and cooling. In the manufacture of some fireclays sawdust is mixed with the clay and is burnt on firing, leaving the open porous texture required. The minimum fusion point for a fireclay is usually taken at about 1,600° C.

Fireclays abound in the British coalfields. Often the finest clay is found at the depth of many feet, and underlying or alternating with coal-seams. The beds do not usually exceed two feet in thickness. Deposits are worked in Cornwall, Devon, Dorset, and else-

where in the S. of England. Fireclay from Stourbridge, in Worcestershire, said to have been worked in the 16th century, is largely exported on account of its excellent qualities. *See Brickmaking.*

**Fire Command.** Unit in coast defence artillery. In every fortified area the efficiency and general readiness for action is entrusted to an officer, usually of field rank, who, as fire commander, is responsible for the fire control of all batteries and groups in the area. It is for him to organize and decide upon the measures to be adopted in the event of attack, and he orders the commencement and cessation of fire on the target, directing which forts or batteries shall engage individual enemy vessels, and what tactics shall be employed to prevent a bombardment or landing. *See Artillery.*

**Fire Control.** System under which a warship's guns are used in action. Fire is controlled from a station aloft, ranges, etc., being passed down to the gun crews. The gunnery officer from his post aloft controls a ship's armament at will, his orders going through a transmitting station to all parts of the vessel. Director firing is the most scientific phase of gunnery, and its methods are confidential. All turrets, i.e. the armoured positions wherein the big guns lie in pairs, are indicated by a letter for fire control purposes, and the gunnery officer can use the weapons singly or in groups at his discretion. *See Gunnery.*

**Firedamp.** Name given by miners to the most important of the gases which are found occluded in the crust of the earth. It is the carburetted hydrogen or marsh gas ( $\text{CH}_4$ ), which appears in coal mines. When diluted with air in certain proportions it forms a mixture which will explode with great violence if lighted either by a flame or by contact with an incandescent surface. Such an explosion occurring in a coal mine may kill the workers either directly, by its mere mechanical violence, or indirectly, by destroying the workings or machinery of the mine.

Like marsh gas itself, firedamp has been formed by the decomposition of vegetable matter. All beds of coal are more or less porous, being traversed by numerous seams, while pockets may occur here and there. In many cases firedamp has accumulated in a bed or in adjacent strata until it has attained a considerable pressure. A stroke of a pick or a drill or the falling of a block of coal may suddenly release this gas, which may be distinctly heard escaping. If the

barometer is low, that is if the normal pressure of the air in the workings becomes reduced, the gas will the more readily tend to escape; hence the importance to miners of weather forecasts or warnings.

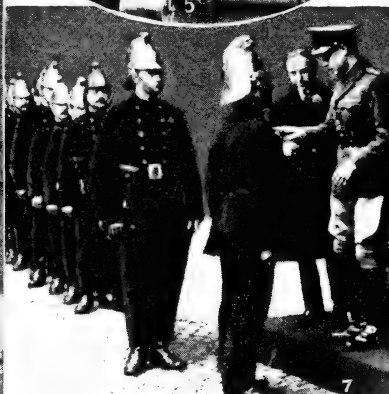
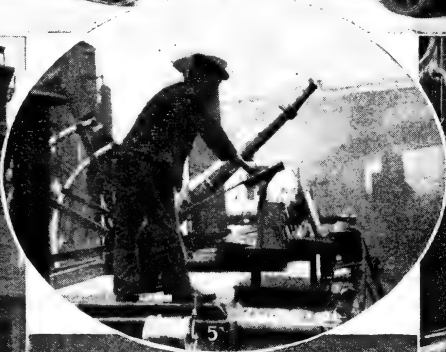
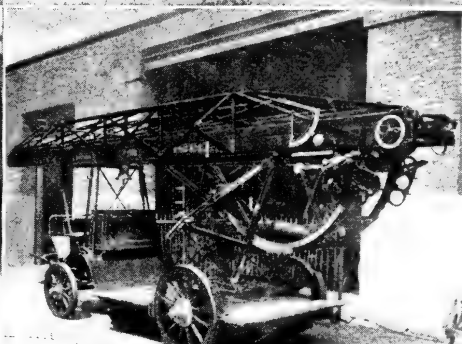
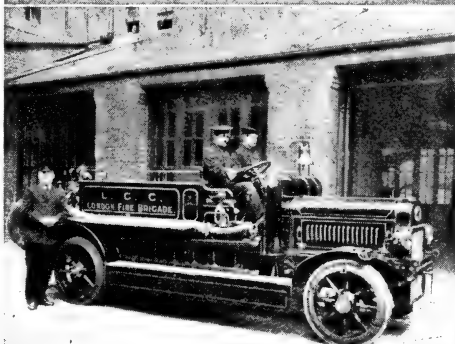
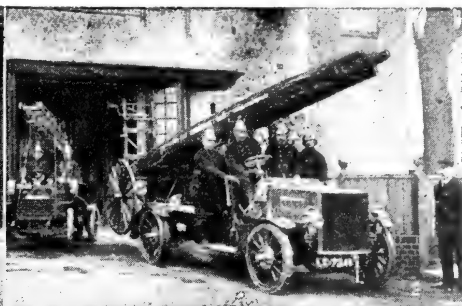
The proportion of air needed to make an explosive mixture varies according to the composition of the gas itself, which may contain other gases, particularly oxygen and nitrogen, and still more according to the state of the atmosphere of the mine, e.g. the amount of coal dust in the air. The proportion may range from one part of the gas to from seven to fifteen of air. A dangerous accumulation of the gas may thus be recognized by a change in colour of the flame of a miner's safety lamp, the use of which, to the exclusion of naked lights, is imperative in all mines where any large quantity of firedamp may suddenly appear. *See Mining; Safety Lamp.*

**Fire Door.** Steel or iron door of a furnace through which fuel is passed. In some cases the doors are arranged to hinge open, and in others to slide across the opening, and hand-levers are fitted for opening and closing them. *See Furnace.*

**Fire-eating.** Branch of the juggler's art. It includes exhaling or swallowing flame, holding red-hot iron between the teeth, drinking molten substances, and similar pretensions. A writer of the 2nd century described breathing from the mouth of flame and smoke as arising from inflammable matter inside a nutshell wrapped in tow. In 1672 Evelyn saw Richardson chew and swallow glowing coals and brimstone, besides pouring molten lead—perhaps cold quicksilver—on his tongue. In 1762 Strutt saw Powell broil a piece of beefsteak upon his tongue with glowing charcoal placed beneath it. In 1814 Josephine Girardelli claimed to put molten lead into her mouth and to spit it out marked with her teeth. These effects were produced partly by utilising unfamiliar physical and chemical principles, partly by sleight of hand.

**Fire Engine.** Particular kind of water-pumping machine used for the purpose of throwing a stream or streams of water on to a fire to extinguish it. Fire engines were among the earliest applications of mechanical science to useful purposes. Hero of Alexandria, the inventor of the first steam engine, about 150 B.C., describes what he calls a "siphon" used in his time to put out fires.

This apparatus, in its essential ideas, was identical with the common manual fire engine developed slowly during the centuries and



1. Old style turn-out with horse-drawn engines.  
2. Turn-out of motor equipment. 3. 1919-20 pattern of motor fire engine. 4. Turntable firetower, with reach of 90 ft. 5. Rocket apparatus on fire float. 6. Firetower

shown in No. 4 raising a man to a height of 90 ft. by engine power. 7. The Prince of Wales decorating fireman at Southwark Bridge Road station, Feb. 12. 1920. 8. Fireman equipped with lamp and breathing apparatus

# **FIRE BRIGADE: THE LONDON COUNTY COUNCIL FIRE BRIGADE AND ITS WORK**

*Topical Press and Clarke & Hyde*

still largely used to-day. It consisted of two cylinders with plungers working in them and connected with a common wooden beam by which the plungers were alternately moved up and down in their cylinders. In the former movement the plungers drew water into the cylinders, and in the latter they forced it out through a common jet, the double arrangement permitting a continuous discharge. It also appears that the apparatus, either by design or accident, included an air chamber which would give steadiness to the discharge.

The Romans made large leather bags which they filled with water and then forced the water out by pressing the bags, thus enabling them to throw the water some considerable distance through long spouts attached to the bags. Water syringes were used in Germany in the 16th century and in Great Britain till the end of the 17th. The latter took two or three men to work them, but were not very effective. In 1657 there existed in Nuremberg a fire engine which was drawn by horses and took 30 men to work it which from the description given by a contemporary writer was a practical adaptation of the apparatus described by Hero. The hose and suction pipe were introduced by the Dutch engineer Jan der Heide in 1670, while in 1684 the French architect Claude Perrault suggested the use of the air chamber.

The immediate precursor of the modern fire engine was the machine made by Richard Newsham, a pearl button maker of London, who took out patents for his engine about 1730. Again in essential ideas this machine was on the lines of the form described by Hero, but it was a practical and efficient apparatus, and Newsham constructed a considerable number, one of which at least was sent to New York. At a demonstration in London, Newsham threw a jet of water over the grasshopper which crowned the top of the then Royal Exchange, a height of 160 ft. One of his engines, supplied to Dartmouth, is now in the museum at South Kensington, in good working condition. Newsham's engine was similar to the hand-power engines now found in many large country mansions.

A modern fire engine consists of a special type of tubular steam boiler, very compact, and capable of raising steam to a pressure of from 100 to 200 lb. per square inch in a few minutes, and one or more steam-driven pumps, all mounted on a light but strong wheeled carriage. Until recently

the engine was drawn by horses, although it has frequently been proposed to draw it by its own steam; but of recent years the petrol motor tractor has displaced horses to a very large extent. Such an engine will throw from 500 to 1,400 gallons of water per minute to a height of 150 feet. Its total weight will be about 2½ tons. Specially powerful engines will weigh from four to five tons, inclusive of the water in their boilers. Engines with motor tractors and motor-operated pumps are also largely adopted. The whole engine is much lighter than a steam engine, thus reducing the weight that has to be transported through the streets, while the trouble of getting up steam is avoided. Nevertheless, many competent fire engineers consider that the steam-operated pumps still have the balance of advantages.

**Fire Escape.** Device of two general classes: those which are permanently attached to the building, and those which are brought to it when a fire has broken out. To the former belong many appliances, from the simple knotted rope attached at one end to a window frame, and by the aid of which a cool man may climb down to the ground in safety or lower a person from a considerable height, to the elaborate external staircases and balconies built of iron with which many modern buildings, such as factories and large hotels in this country, and still more in the United States, are now provided.

Of the portable appliances the chief is the familiar wheeled ladder, consisting of a principal ladder and a number of supplementary or extension ladders, which when joined together permit a height of 60 feet and over to be reached. The escape is also provided with a chute or shoot of copper wire netting which is attached to the under side of the ladders and rises with the extension. A person may slide down this shoot to the ground without risk of injury. For the same purpose shoots of stout canvas are adopted and kept permanently ready for use in many establishments where numerous workers are congregated on upper floors. They are in the form of a large pipe, with appliances at one end by which the shoot may be attached to a window or held from the inside of a room in the building. When in use the lower end is held by two or three persons on the ground, standing at a distance from the building, so that the shoot hangs at an angle. A child may be sent down such a shoot with perfect safety. The hook ladder may be used as a fire

escape, although its primary object is to enable a fireman to gain access to the upper floors of a burning building. *See Fire Prevention.*

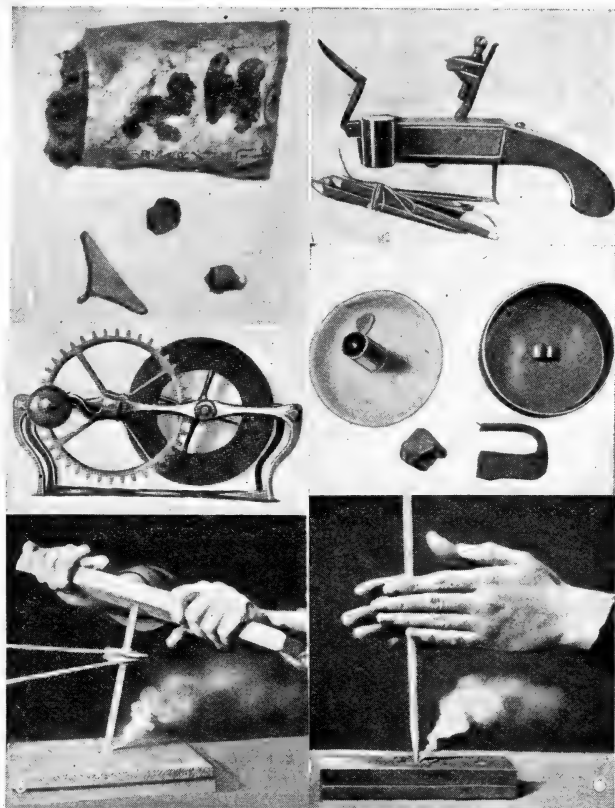
**Firefly.** Name applied generally to beetles which are luminous in the dark. In Europe they are represented by the family Lampyridae, of which the glow-worm is a familiar example. In America and the West Indies the genus *Pyrophorus* of the elater beetles are famed for the green and red lights which they display in flight. Fireflies are frequently used as hair ornaments in the W. Indies, and also in S. Italy.

**Firelock.** Musket in which the means of igniting gunpowder was by flint and steel. About 1690 it replaced the matchlock, a musket that required a burning match to discharge it. In the old drill books the command "Shoulder your firelock" was used before "Shoulder arms" came into use. *See Flint Lock; Gun; Musket.*

**Fire-making.** Artificial production of flame, spark, or glowing heat. Of primeval invention, it became one of the mightiest factors in human culture. Natural manifestations of fire were doubtless feared before man perceived its beneficent possibilities. Use gave rise to preservation, preservation to production at will.

Artificial fire may have originated in wood-friction. A Moustertian beechwood fire twirl (Tylor's fire drill) was found in 1904, at Krapina, in Croatia. Fire twirls are rotated between the palms in Australia, as in ancient India and Mexico, are aided by a cord by the Maoris, and by a bow in early Egypt; they are gripped by the teeth by the Eskimo, and weighted with a spindle-whorl by the Chukchi. Other frictional appliances are stick-and-groove fire ploughs rubbed along the grain in Polynesia, and fire saws rubbed across the grain by the Malays. A pneumatic fire piston is peculiar to modern S.E. Asia. The primeval percussion implement—strike-a-light—resulted from flint-knapping, and flint and pyrites developed into the early iron-age flint and steel.

**Fireplace.** Recess in the wall of a room, formerly consisting of an open space walled on three sides by stone or bricks, but now generally filled with a metal fitting, which contains a fire for heating purposes. The earliest form of fireplace is commonly believed to have been the hearth in the centre of a room, but there is evidence that the wall fireplace has an equally long ancestry. In the Norman keep, for example, where the rooms were placed one over the



Fire-making. 1. Chinese flint, steel, and bag of tinder. 2. Early 19th century strike-a-light. 3. Steel mill, formerly used in coal mines for striking a light. 4. Tinder box with flint and steel. 5 and 6. Fire drills, making friction between hard and soft wood

other, wall fireplaces were the rule, since a central hearth in any but the topmost room would have been an impossibility.

Extant specimens show that these fireplaces were recesses in the wall surmounted by round arches. There was no chimney shaft; the smoke escaped by a short flue leading almost directly to a small vertical opening in the outside wall, concealed in the angle of a buttress. In one-storeyed buildings the central hearth was often used, and this type of fireplace persisted until late in the 16th century. The great hall at Richmond Palace, and the hall at Penshurst Place, Kent, retain examples.

The opening in the roof, through which the smoke was carried, was protected by a small turret, or *louvre*, which kept out the rain while allowing the smoke to escape. Chimney shafts began to appear about the middle of the 13th century, but were not carried above the level of the eaves until considerably later, and it was not

until Elizabethan times that the chimney stack was developed as an architectural feature. Then the number of fireplaces greatly increased, calling for a corresponding enlargement and beautification of stacks to contain the flues.

Gothic fireplaces are generally treated in the simplest manner. The hood, sometimes with corbels, is the chief and only decoration of most 13th century fireplaces, and the single square-framed arch which followed it was equally devoid of ornament. The Renaissance brought the architectural chimney-piece and elaborate overmantel, and though there was a return to greater simplicity in the Later Renaissance, the taste for a decorated fireplace had taken firm hold. See *Building*; *Chimney-piece*; *Chimney Shaft*; *House*; also *illus. pp. 1948 and 1949.*

**Fire Prevention.** Fire prevention systems are of two classes: those directed to the prevention of an outbreak, and those designed to deal promptly with one when it has

already occurred. The former are chiefly structural and are mostly represented by the use of non-flammable materials in the erection of buildings. If the floor, the walls, and the roof or ceiling of a room can be made of materials which do not readily take fire, the contents of the room may be destroyed by fire without serious risk to other parts of the building.

Iron, notwithstanding its great strength and structural value in building, is not a good fire-resisting material. It will bend and twist and bring about the collapse of a whole building; and even where it retains its position and form in the course of a fire while merely exposed to the heat, it may be almost instantly destroyed by being drenched while hot with water from the fire hose. Hence, in the modern "fireproof" building, while iron or steel is very largely used, it is invariably enclosed in some form of protective covering—brickwork, concrete, or cement—which will shield it from the direct action of a fire. The extensive use in modern buildings of reinforced concrete is due not alone to the moderate cost of that system of construction, but also to the fact that it is so largely fire-resisting. The general and unavoidable use of wood in buildings still constitutes a serious fire risk nearly everywhere, and not least on board ship; but timber is much less extensively employed than formerly, and the risk of fire may be reduced by the use of wood fire-proofing processes.

To the second class of fire prevention systems belongs a large number of appliances, comprising internal fire hydrants or stand-pipes connected permanently to a reliable source of water, which may be brought into operation instantly on any floor of a building and in large buildings at more than one point on any floor; the free provision of fire buckets always kept filled with water and always maintained in proper number and in order at definite stations; the adoption of sprinklers; the use of automatic pumps which are either arranged to be driven by a separate electrical connexion or by any independent steam service, so placed and arranged that they may be put into operation instantly; chemical fire extinguishers and the instalment of automatic fire alarms (*q.v.*). See *Concrete*; *Sprinkler*.

**Fireproofing.** The idea underlying this term is, of course, that of treating a material, normally inflammable paper, fabric, or wood, in such a way that it will not take fire. The idea is a very old one, and innumerable processes have been



suggested in connexion with it. No method has yet succeeded in rendering any such materials *incombustible*. The most that has been achieved is to render them less *inflammable* than they are in their natural conditions. That is to say, the materials may after treatment slowly burn away, if the surrounding temperature be raised sufficiently high, without bursting into flame. This may obviously be an important end attained, as if flame can be avoided the risk of a fire spreading is immensely reduced.

The substances proposed as fireproofing agents include common salt, alum, sulphate of zinc, sulphate of ammonia, sulphate of soda, sal ammoniac, borax, sulphate of lime and of baryta, lime water, ammonium phosphate, ferric sulphate, and silicate and tungstate of soda, the two latter probably being those most generally and successfully employed. Many of these substances are unsuitable for use on fabrics, for the reason that they rot them more or less. All such substances, which are applied by soaking the fabric in a solution of the salt in water, act by depositing minute crystals of the salt in the pores of the fabric. By thus closing up the pores of the material with a non-inflammable substance, access of air to the pores is prevented, and thus, while the fabric may char superficially by the exposure of its surface to a high temperature, it will not take fire.

To secure the best results it may be necessary to soak the material in the solution more than once, drying carefully after each immersion. Also it may be necessary to repeat the process from time to time if the proofed material is much used, as, for example, in the case of theatre fabrics, as the crystals are only held mechanically in the pores of the fabric and will gradually shake out. In fireproofing wood, for which purpose tungstate and silicate of soda and sulphate of zinc are chiefly used, the penetration of the pores of the wood by the solution is usually assisted in the best processes by first exhausting the air from the wood as far as possible by keeping the material under a vacuum for some time before the solution is introduced.

In addition to substances which are intended to penetrate the material, certain so-called fireproof paints are employed for coating wood superficially. These paints are composed chiefly of sodium silicate, zinc chloride, and asbestos, frequently in combination. They undoubtedly assist to prevent wood from catching fire, but are liable to peel off more or less. Brushing

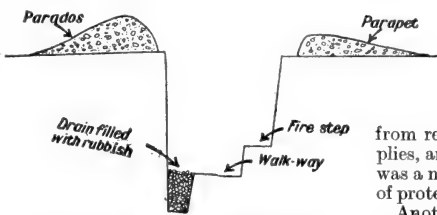
timber with common limewash two or three times will render it to a great extent non-inflammable.

**Fire Raising.** Term used in Scots law for the act of wilfully setting on fire the property of another. The English equivalent is arson (*q.v.*).

**Fireship.** Wooden vessel filled with combustibles that used to be set on fire and made to drift down upon an enemy fleet when it was at anchor or in harbour. The fireships were sent in thus to create panic or set on fire enemy vessels as they came in contact with them. The coming of steel and steam made the fireship obsolete.

A notable instance of the use of fireships was the attack made by means of them on the French fleet in the Basque Roads, on April 11, 1809. At Lord Cochrane's suggestion eight fireships and three explosion vessels, containing 1,400 barrels of powder with 400 shells and thousands of hand-grenades were sent against the French on a dark night. So great was the panic caused by the explosion of these vessels that most of the French crews cut the cables and allowed their ships to drift ashore. An earlier instance was their use against the Spanish Armada. *See Armada.*

**Fire Step.** In the military sense, the raised portion of the floor of a fire trench on which



Fire Step. Sectional diagram illustrating method of trench construction

stand the men who are actually firing over the parapet or through the loopholes. In temporary trenches, which are made narrow, the lower portion of the floor has little width, and chiefly acts as a drain to remove any water which may find its way into the position. In trenches which are to be occupied for a considerable length of time, the whole excavation is made wider and the floor arranged at three different levels, the highest on the forward face being the fire-step, one at an intermediate level, furnished with duck boarding, providing a walk-way, along which people may pass without interfering with the men who are firing or acting as look-outs, and where the parapet affords

them complete cover while in an erect position, the lowest portion of the floor serving as a drain.

**Fire Tactics.** Term employed to designate the arrangements made for bringing hostile troops under effective fire, whether from small arms or artillery. Fire tactics includes both the dispositions made of the troops who bring fire to bear and the fire control by which the fire is directed. It is always a great advantage if some troops can be located so as to be in a position to bring enfilade fire to bear on the enemy, while indirect fire, which is brought to bear from a position in which the enemy is not visible, is usually demoralising. Surprise effect is always of the greatest value, and may frequently be obtained in defence by some units withholding their fire until a definite stage has been reached by the attack, and in attack by working some units round to a position in which the enemy does not expect them.

The method was occasionally employed by the Germans during the Great War of placing machine guns in the area over which an attack was expected in such a way that they remained concealed until the attacking troops had passed, and then fired into their rear. The extensive use of strong field entrenchments necessitated violent artillery bombardments in order

to obliterate these defences as a preliminary to any infantry attack. Barrage fire was developed in order to screen any area

from reinforcements and supplies, and the creeping barrage was a most successful method of protecting attacking troops.

Another rôle played by the artillery in fire tactics is counter battery work, certain units

being detailed for the special duty of keeping the hostile artillery under such heavy fire that they will be unable effectively to support their infantry. Successful fire tactics are largely dependent on effective observation and communications in order that every advantage may be taken of the changing situations. *See Artillery; Tactics.*

**Fire-Walking.** Magical rite practised by several primitive peoples, mainly to ensure sunshine and bountiful crops. The celebrants walk barefoot over heated stones or embers, and are reputed to emerge unscathed. S. P. Langley, witnessing the ceremony at Tahiti in 1901, found that the volcanic rock used was a bad conductor, the upper surface being

only moderately warmed. W. L. Allardye, watching it in Fiji in 1904, reported that a handkerchief was charred by the stones, and that a thermometer registered an air temperature over the pit of 280° F. Other modern accounts come from Mauritius, New Zealand, Japan, China, India, and Bulgaria. The rite sometimes consists in passing through flame, especially as an act of devotion, a custom preserved among European rustics when leaping over bonfires "for luck."

Fire-walking as a chastity or sanctity ordeal was recorded in

early Vedic India (c. 1200 B.C.), passed into medieval Europe, and in the form of treading barefoot over nine glowing ploughshares was successfully accomplished by Queen Emma, mother of Edward the Confessor. *See Ordeal.*

**Fire-Water.** Generic, popular name for any spirituous or distilled liquor, originally used by the natives of half-civilized lands for European cordials. It is akin to the Spanish name for brandy, *aguardiente*, or "burning water," to the Celtic *usquebaugh*, or "water of life," and the French *eau-de-vie*. *See Brandy.*

Messrs. Brock at the Crystal Palace from 1865 to 1910 and after the Great War were perhaps the most important factor in the development of the art. Other historical displays in recent years are the display on the Tagus for the marriage of the king and queen of Portugal in 1886; that for the tercentenary celebration at Quebec in 1908; and the official Peace Day display in Hyde Park in July, 1919.

Broadly speaking, the same principle governs the compositions of all fireworks, that is to say, a substance which readily takes up oxygen is put in intimate contact with one which readily supplies it. Of the latter the most frequently used are nitrate of potash (saltpetre) and chlorate of potash, and of the former, sulphur and charcoal, or other carbon compounds, such as gums, resins, starch, etc.

#### Composition and Construction

Many of the metals are used either in the form of salts, as those of copper, lead, or mercury, or pure, in the form of powder or filings, as iron, steel, magnesium, and aluminium. The pure metals are generally added to produce glowing sparks or coruscations, or to add brilliance to the burning. Colours are produced by the addition of metal salts, strontium producing red, sodium yellow, copper blue, barium green. The salts most commonly used are the nitrates, chlorates, carbonates, and perchlorates.

The usual method of construction is to charge the composition into a case composed of strong paper rolled on a former; the end to be ignited is covered with an easily ignited and hotly burning composition or priming, the function of which is to ignite the main filling. Priming compositions usually contain meal gunpowder. In some fireworks the case burns down with the composition, as in the case of lances, and starlights and Catherine wheels. The latter consist of a long, charged case wound round a circular block of wood, the fire issuing with sufficient force to rotate the wheel round a pin inserted through a hole in the centre of the block. Generally the case does not burn, and by this means the fire is projected with more force from the mouth of the case. To this type belong Roman candles, which have at intervals down their length stars which are projected upwards from the mouth of the case to a considerable height. These stars of colour or other suitable compositions are compressed into small cylinders to fit the bore of the case, and primed. When still more force is required,

## FIREWORKS: FOR WAR AND DISPLAY

Alan St. H. Brock, Director, Brock's Fireworks, Ltd.

*This article, which traces the development of fireworks, is supplemented by shorter ones on the various fireworks themselves, e.g. Rocket; Roman Candle; Squib. See also Gunpowder*

The science of pyrotechny is of great antiquity in the East, where, however, little progress has been made. The Indian pyrotechnists are considerably in advance of the Chinese in display work, but both depend on gunpowder, Chinese fire, and a few simple colour compositions, the remainder of the display being made up of such adventitious aids as transparencies, paintings, decorated framework, and, among the Chinese, paper patterns. Travellers in China give enthusiastic accounts of Chinese exhibitions which—without these accessories which have no claim to be called fireworks—would not produce a display equal to that given in their own country at a provincial flower show.

Although originally the art was introduced in Europe from the East, most of the set pieces and devices used in India to-day are primitive copies of European originals. The European method of outlining pictures with a series of small fireworks known as lances, connected by quickmatch, is imitated by the Hindu pyrotechnists with small wicks burning in oil.

#### Early European Fireworks

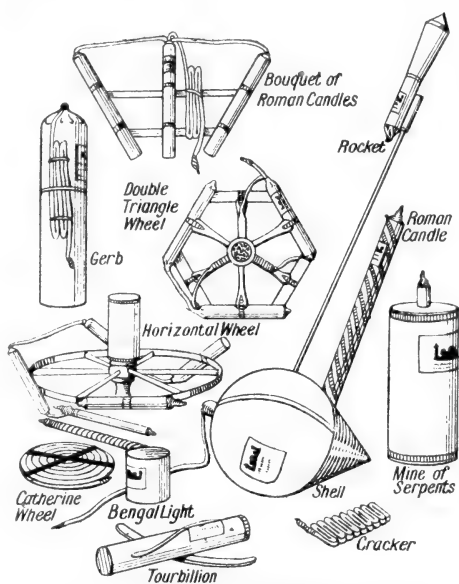
The Japanese alone of Eastern peoples have made progress in genuine firework effects, the aerial shells being particularly fine, depending for their effect on their wonderfully careful and exact construction.

In Europe there is very little early record of fireworks, but it seems most likely that pyrotechnic compositions were introduced by the Crusaders in the 13th century. Richard Coeur de Lion used Greek fire in his own galley. Jebb, in his preface to Bacon's *Opus Majus*, refers to two fireworks evidently

the prototypes of the rocket and the cracker. Stowe mentions that two foreigners, Peter Band and Peter van Cullen, made for Henry VIII hollow shot of cast iron filled with "firework or wild fire." The first serious work on pyrotechny published in Great Britain is *Pyrotechnia*, by John Babington, Gunner, 1635; there is another work on fireworks published the same year by John Bate, who mentions in his preface that other authors were writing on the same subject. The contents of these works indicate that by this time the art had greatly developed, the form, methods of making, and nomenclature of the firework units approximating to those of the present day. The methods of displaying and the contained compositions, however, have greatly advanced since then.

#### Display in St. James's Park, 1749

Up to the beginning of the 19th century the display was expanded, as in the East, by the addition of pictures, transparencies, bonfires, etc. In the official programme of the display in St. James's Park to celebrate the peace of Aix-la-Chapelle, 1749, several pages are devoted to a description of the Machine for the Fireworks in the form of a Doric temple 114 ft. high and 410 ft. long, ornamented with "frets, gilding, lustres and artificial flowers, inscriptions, statues, and allegorical pictures." It seems that these adjuncts were looked upon as the fireworks proper, the fireworks themselves as now accepted being known as "artificial fireworks." During the 19th century, displays became gradually to consist of veritable fireworks; great advances were made. The weekly displays carried out by



Fireworks. Various types of fireworks in popular use for displays and illuminations

the mouth of the case is choked, either by a diaphragm of compressed clay with a central hole, as with gerbs and small rockets, or by constricting the case itself before drying, as with large rockets.

Tourbillons and Saxons are similar in action; both have the ends of the case closed with clay and a horizontal hole bored near either end, so that the fire issues at right angles to the axis. The holes in the Tourbillon rotate the case on a piece of curved wood secured to its centre, and secondary holes pointing downwards project it into the air. The Saxon revolves on a nail, fixed horizontally, driven through the centre of the case.

What may be called compound fireworks are composed of a number of the foregoing, fixed to wood frameworks in the form of wheels or geometrical patterns. In the revolving pieces the motive power is supplied by gerbs or turning cases which are in effect small rockets without heads. The best known pieces are rainbow, single and double triangle or caprice wheels, revolving fountains, Saxon cross, chromatrope, tree piece, and many others. The fireworks are connected on the framework with quickmatch, which is cotton wick soaked in a paste of starch and gunpowder, dried, and threaded in a paper tube.

What are known as lancework set pieces are carried out with small coloured fireworks or lances spaced at short intervals following

the lines of a design or picture and connected by quickmatch. The real development of lancework, which had hitherto been used merely to outline spokes and scrolls on wheels and for similar purposes, dates from 1879, when portraits and other pictorial effects were introduced at the Crystal Palace.

Aerial fireworks are either rockets or shells, or modifications of them. Rockets consist of rolled paper cases choked at one end. In filling, the case is placed on a metal nipple having a tapering spindle in the centre, the composition is



solidified by blows of a mallet on a hollow wooden drift. The top of the case is fitted with a paper cap containing the "garniture" of the rocket, stars producing various colours and effects. The case has a short tube fixed to the side to receive the dowelled end of the stick, which directs the flight and, by passing through two rings on a post or frame, holds the rocket in position whilst firing.

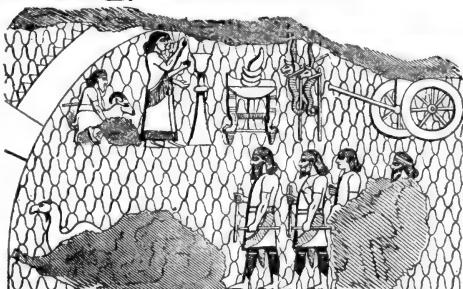
Shells are papier-mâché hollow spheres filled with stars, or other pyrotechnic effects, and bursting charge. They are fired from a mortar of approximately the same diameter by means of a lifting charge of gunpowder in a conical bag fastened to the lower side

of the shell. The quickmatch which lights the lifting charge also ignites a time fuse at the top of the shell, which again ignites the bursting charge and contained effects upon reaching its maximum height.

Besides their spectacular value, fireworks have many utilitarian uses. The life-saving rocket used by the coast guard and National Lifeboat Institution carries a line from the shore to wrecked ships, and the later development, the Schermuly and Brock rockets, carry the line from the ship to shore, thus getting the advantage of the wind, as the vessel is generally on a lee-shore.

During the Great War pyrotechnics were of great value for signalling and other purposes, the Very light being practically a single star Roman candle fired by percussion from a specially constructed pistol. Parachutes fitted with lights for illumination or signalling purposes and coloured smoke-producing stars were used from aeroplanes, either fired from Very pistols or through a dropping tube which ignited them electrically. The Dover flares, giving over a million candle-power, used on the attack on Zeebrugge, and by the Dover anti-submarine patrol, aeroplane landing lights, star shells, and many others were the outcome of experience gained by pyrotechnists in the manufacture of recreative fireworks.

**Fire-worship.** The ritual expression of reverence for fire as a natural element affecting human welfare. It is traceable in Dahomé, among the Aino, some Mongols and American Indian tribes. In ancient Mexico, Xiuhtecutli was revered with daily offerings and periodic rekindlings before his image. The cult prevailed in early Aryan India, whose fire-god Agni, personifying earth-kindled fire, lightning, and solar heat, was reborn daily of ten maidens, the fingers which twirled the sacred fire-drill. Honoured by 200 Vedic hymns, his ritual still survives here and there.



Fire-worship in ancient Nineveh. Fire-altar and sacrifice, from a bas-relief at Kouyunjik, Assyria. Above, fire-altar from Khorsabad, Assyria

In early Persia a less developed fire-worship appears in the Avesta, wherein Atar, a son of Ahuramazda, shares his conflict with darkness and impurity. In the Mazdean ritual, sacred fire, preserved in fire-temples, is not an object of worship but an emblem of divine power. This view is maintained by its modern exponents, the Persian Gabars and the Indian Parsees. At Baku, on the Caspian Sea, 18th century pilgrims gathered for expiation before stone temples near the burning oil wells. Many phases of culture exhibit fire-rituals loosely classed as fire-worship. The perpetual fires of the Greek *prytaneum* and the Roman *regia* with its vestal virgins were forms of Aryan hearth-ritual. These rites survive, with much primitive superstition, among E. European peasantry, and in Damaraland. The Semitic use of perpetual fire-altars for burnt offerings, incidental rather than essential, passed into the ceremonial lights of ritual Christianity. See Moloch; Sun-worship; Zoroastrianism.

**Firing Test.** Experimental firing of pieces of ordnance to ensure their reliability. Before acceptance guns are required to fire one or more rounds with increased charges without showing undue expansion of the bore, and a number of rounds with normal charges to ascertain that the range and accuracy of the piece meets the requirements of the specification. The firing test is additional to careful measurement of the bore and all working parts, and mechanical and chemical tests of the materials used in construction. See Artillery.

**Firkin.** Old English ale measure, the fourth of a barrel, or 9 galls. Originally it varied from  $7\frac{1}{2}$  to 8 galls., and now it would equal  $9\frac{1}{4}$  imperial galls. As a small wooden cask to hold butter, a firkin contains 56 lb. The word is derived from Dutch *vierde*, fourth, and a diminutive suffix -kin.

**Firlot** (Four lot). Obsolete Scottish measure of dry capacity, being the fourth part of a boll. It varied for wheat and barley, and in different localities.

**Firm** (Span. *firma*, signature). Word used for an association of business men. In commercial circles of the 17th century and thereabouts it was used for a business signature, one that clinched a deal, and was then applied to the business house that signed. It is now the legal term for members of a partnership (*q.v.*).

**Firmament** (Lat. *firmare*, to make firm). Term used for the area of the heavens. It is used to trans-

late the Hebrew word *rakia* (Gen. i, 6), and refers to the universe. See Stars; Universe.

**Firman** (Pers.). Passport issued to favoured travellers by the Turkish government. The term is also applied to a licence to carry out some enterprise or undertaking, or to engage in a particular trade. A firman bears the name of the sultan, and only a special minister, the *nishanji* (signer) effendi, has the right to affix the sultan's name.

**Firminy.** Town of France. It is in the dept. of Loire, 8 m. S.W.

## FIRST AID: HOW TO HELP THE INJURED

H. E. Davison, M.D., Examiner, St. John Ambulance Association

*This article is one of a group that includes Ambulance; Hospital; Red Cross. See also Dressing Station; Medicine; Surgery*

First aid is a term for assistance which may be given in cases of accident or sudden illness before medical advice can be obtained. A knowledge of the principles of first aid has been promulgated widely in Great Britain by the operations of the St. John Ambulance Association, St. John's Gate, Clerkenwell, E.C.; the British Red Cross Society; the St. Andrew's Ambulance Association, and various educational authorities. During the Great War, 1914-18, men possessing first aid certificates from one or other of these associations proved of great value in augmenting the established strength of the Royal Army Medical Corps, and, in civil life, in undertaking stretcher-bearer and dressing-station duty during air-raids.

As regards the details of first aid, bleeding demands priority of attention in any accident. It may be stopped by firm and continuous pressure upon the bleeding point, or on the appropriate pressure point in the case of arterial hæmorrhage. All dirt, etc., should be removed and the wound thoroughly cleansed with boiled water and dressed with clean lint, linen, or cotton. Out of doors, a wound should never be bathed with water unless one can be certain that the water is clean. A handkerchief, if clean, should be applied to the wound, or, if only a soiled handkerchief is available, the inside of an envelope may, in the emergency, be placed next to the wound, and the handkerchief used as a bandage.

### Treatment of Fractures

All fractures should receive attention before any attempt is made to remove the patient from the place of accident. Treatment should be directed towards the immobilisation of the broken bone. Splints consisting of any rigid material, as wood from boxes, stout cardboard, walking sticks, umbrellas, broom-shanks, etc.,

of St. Étienne. Situated in a coal district, it yields an average of 90,000 tons a year and employs over 4,000 men. Other industries are steel and iron manufactures, also those of woollens, buttons, and ribbons. Pop. 19,580.

**Firozabad.** Town of the United Provinces, India. It is in the Agra district. The town, which is ill-built, is 24 m. E. of Agra. Dating from the 16th century, it contains an old mosque and some temples. Pop. 13,571, 55 p.c. Hindus, 35 p.c. Mahomedans.

should be applied and held in position by extemporised bandages. If practicable the splints should be of such length and so arranged that the joints above and below the seat of the fracture are kept at rest. In fractures of a bone of one of the limbs, the limb should be gently straightened before the splint is applied, and in the case of the upper limb support should be afforded by a sling.

### Dislocations and Sprains

In dislocations the limb should be placed and supported in the most comfortable position, and cold dressings applied; but otherwise not treated except by a doctor, as by unskilled manipulation grave damage may be done to blood-vessels and nerves in the neighbourhood of the injured joint.

In sprains a firm bandage should be applied and kept wet by the application of cold water. If the ankle is sprained when out of doors the boot should not be removed until the patient returns to his house, as a laced boot acts temporarily as a useful support. Whenever it is doubtful whether the injury sustained is one of sprain or fracture the case should be treated as if it were a fracture.

For burns and scalds treatment should be directed towards the exclusion of air from the injured part, and this may be effected most readily by the immersion of the part, if a limb, in warm water in which bicarbonate of soda has been dissolved. The burn or scald should then be dressed as soon as possible with strips of lint, linen, or cotton, covered with some antiseptic ointment, e.g. boracic ointment. Any clothing adherent to the burned flesh should be allowed to remain, the remainder of the garment being cut away.

If clothing is set on fire the patient should lie down at once on the floor with the flames uppermost. The flames should then be

smothered by covering them with any rug, blanket, cushion, or table-cover which may be at hand. Apparent drowning or asphyxiation should be treated by the immediate and sustained application of artificial respiration.

In cases of poisoning a message should be sent immediately to the nearest doctor explaining the nature of the case, and, if possible, giving the name of the suspected poison. The bottle or other vessel containing the suspected poison, together with any vomited material, should be kept until it has been examined. Treatment should be directed to the elimination of the poison by the administration of an emetic, except in the case of poisoning by a corrosive fluid, such as oil of vitriol, etc., when the lips, etc., will be found to be burned; towards antagonising the action of the poison by administering the appropriate antidote and by giving the patient demulcent drinks; and by neutralising the tendency to shock by promoting the warmth of the patient. Emetics readily obtainable are mustard, one tablespoonful in a tumbler of warm water, and salt, one or two tablespoonfuls in a tumbler of warm water. For children a convenient emetic is the wine of ipecacuanha, of which one teaspoonful should be given every twenty minutes until vomiting occurs. Demulcent drinks are milk, milk beaten up with eggs, cream, and any vegetable or animal oil.

#### Loss of Consciousness

When loss of consciousness occurs, all tight clothing should be loosened, and the patient put where he can obtain an ample supply of fresh air. If the face is pale, the head should be placed on the ground, and the lower limbs elevated. If the face is flushed, the body should be laid flat on the ground with the head slightly raised. In all cases the face should be inclined to one side lest vomiting occurs, and the vomited matter be sucked into the air-passages. No alcohol, or indeed any other liquid, should be given to an unconscious patient. The patient should be kept warm.

Foreign bodies in the eye may readily be removed, if on the under surface of an eyelid, by a camel's hair brush, or the moistened corner of a handkerchief. If the foreign body, however, is on the ball of the eye, and not easily removed by gentle brushing, a drop of almond or castor oil should be dropped into the eye, and a pad of cotton wool bandaged over the eyelid in such a manner that the light pressure of the cotton wool

prevents undue movements of the eyeball, until medical advice can be obtained.

Foreign bodies in the nose or ear should not be interfered with by the unskilled. They will do no harm during the time necessary to secure medical advice. No attempt should be made to remove a needle unless a part of it is projecting. The limb should be kept at rest, and medical advice sought. Stretchers are necessary in cases of serious illness or of accident out of doors, to convey the patient to his home or to a hospital. These may be improvised by removing a door or a field gate from its hinges, or by the use of a ladder.

Clothing should always be removed very carefully from an injured limb. In all cases, it should first be removed from the sound limb, and in some instances it is necessary also to cut away the garment on the injured side. If this is necessary, the trousers or coat-sleeve should always be cut up the outer, and not the inner, seam. A boot is best removed by cutting the lace and then the back seam; the boot will then fall away easily from the foot.

#### Bites and Stings

Bites of animals should be cauterised by a liquid caustic, such as pure carbolic acid or caustic potash, but if no such fluid is at hand, a red-hot wire should be used. If there is any suspicion that the animal which has inflicted the injury is mad, a doctor should be consulted, that treatment for rabies may be carried out without loss of time. In stings of plants and animals the sting should be removed, the part bathed with weak ammonia, and then dressed with a paste of bicarbonate of soda with water or sal volatile.

**Firstborn.** Technical term among the Jews. It signifies "that which openeth the womb," and does not necessarily imply the birth of other children. In commemoration of the deliverance from Egypt, all firstborn human males were consecrated to God, but every child that lived more than one month could be redeemed. In lieu of the firstborn the tribe of Levi were chosen for service, thus becoming the priesthood.

In the case of animals the firstlings, if clean, were offered in sacrifice; if unclean, redeemed. For an ass a lamb had to be substituted, otherwise the neck of the ass had to be broken. The Jews, who are referred to as the firstborn among the nations, still solemnise the redemption of the firstborn on the

30th day after birth. In the N.T. the term firstborn is used in relation to Christ, the dead, and the Church (Ex. 4, 13, 22, 34; Num. 3, 8, 18; Col. 1; Heb. 12; Rev. 1). See Birthright; Passover.

**First Empire.** Name given in France to the period between 1804 and 1814. In May, 1804, Bonaparte was made emperor, and the first republic came to an end. The empire lasted until Napoleon's abdication in April, 1814. See French Revolution; Napoleon.

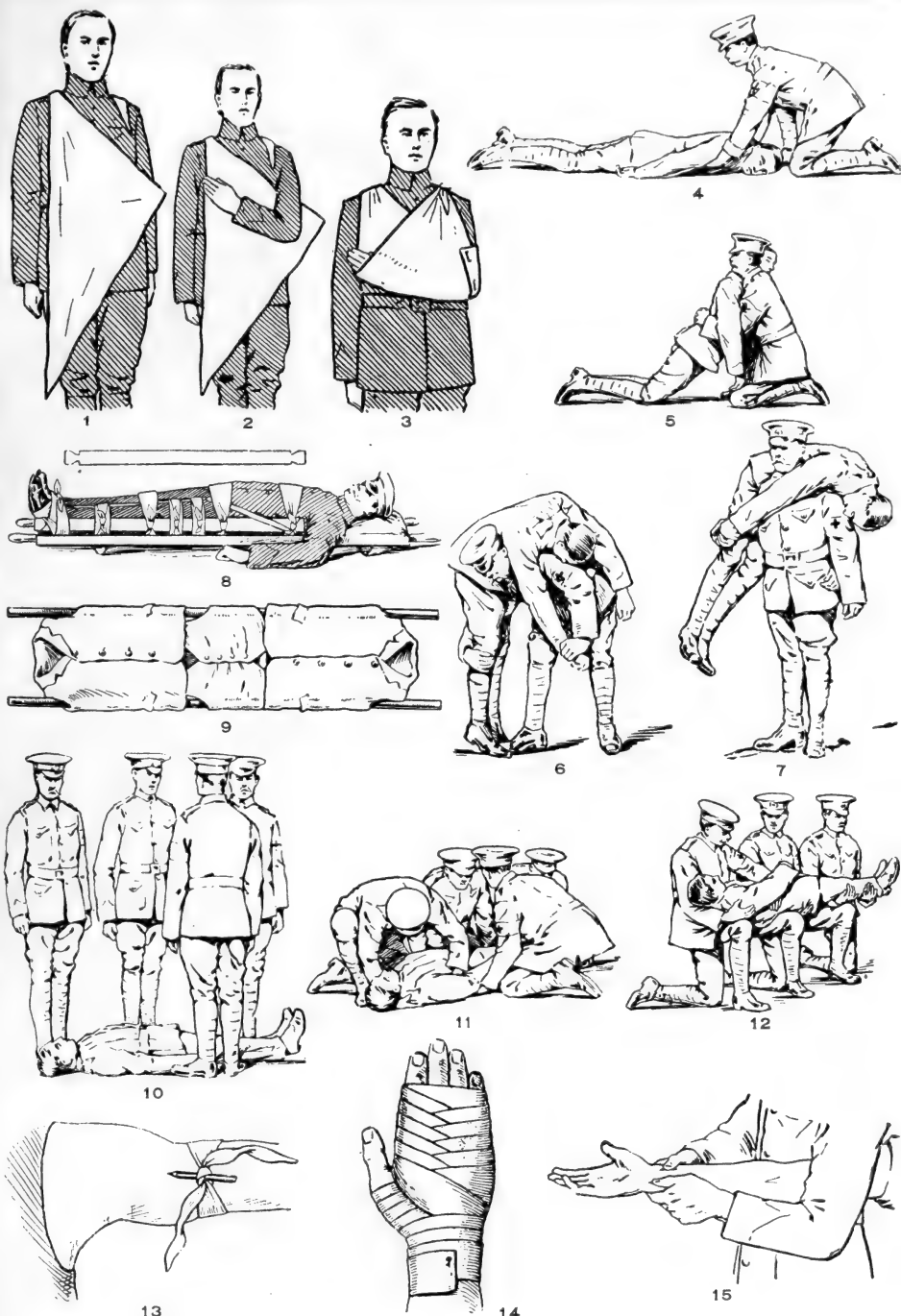
**First Footing.** New Year's Day folk custom, especially in Scotland and the N. of England. It was regarded as unlucky for a woman or a fair-haired man to be the first visitor to any house on New Year's Day. As soon as midnight chimed people hurried to give their friends first footing, to offer them good wishes, and to partake of their hospitality. The custom may be traced back to Druid times, when the priests sent their young men from house to house bearing branches of mistletoe.

**First Fruits.** Ancient religious practice of offering to God a portion of the first fruits of a crop or of the first profits of any commercial undertaking. Prescribed by the law of Moses, among the Hebrews it was usually one-sixtieth, but might be as much as one-fortieth. In the early Christian Church the practice was continued, though it was regarded as a work of devotion and not of obligation. Later, it was claimed by the clergy as their due, and formed part of their official income.

The Apostolic Constitutions (*q.v.*) direct that the first fruits of cattle and crops should go to the clergy, and that other first fruits should be devoted to the relief of widows and orphans. See Annates; Tithes.

**First Offender.** In England at common law there was always jurisdiction to bind over any offender to be of good behaviour. But since many magistrates seemed to ignore this, the First Offenders Act, 1887, was passed, giving all courts of criminal jurisdiction power to bind over first offenders instead of punishing them. The Probation of Offenders Act, 1907, extends this power to all cases, whether first offences or not; and gives the court power to order the first offender to be placed under the supervision of some person named (generally the probation officer) for a period. The order may also provide that the offender shall abstain from intoxicating liquor, refrain from associating with thieves, etc., and shall lead an industrious life. See Borstal System; Children.





1, 2, and 3. Arrangement of large arm sling. 4, 5, 6, and 7. Stages of the fireman's lift. 8. Application of splint, A, to fractured thigh. 9. Stretcher made by passing poles through inverted sleeves. 10. Bearers in position for loading stretcher. 11. Bearers kneeling to lift a

patient. 12. Patient on knees of bearers Nos. 1, 2, and 3. 13. Tourniquet for brachial arteries, backward view. 14. Figure-of-8 bandage for hand with simple spiral for wrist. 15. Digital compression of radial and ulnar arteries to stop bleeding.

# FIRST AID: ELEMENTARY MEASURES AND DEVICES IN FIRST AID TRAINING

**First of June, BATTLE OF.** Fought on June 1, 1794, it was the first great naval action in the



First of June medal and ribbon

War of the French Revolution. France, though victorious on land, was in a situation little short of desperate. It was the epoch of the Terror, the harvest of the previous year had been poor, and famine was threat-

ened. The British blockade was crippling the avenues of supply. The Committee of Public Safety had endeavoured to relieve the situation by purchasing large supplies of grain in the U.S.A., and a convoy of 116 vessels was dispatched, which approached the French coast towards the end of May. Rear-Admiral Nielly was sent out to meet the convoy, which Lord Howe was instructed to intercept.

The main French fleet, under command of Admiral Villaret-Joyeuse, left Brest on May 16 to cover the arrival of the great grain convoy, and it was not until the 28th that Howe sighted his adversary. A good deal of fighting preceded the great action, in which Howe's fleet was shown to be the superior fighting force. His plan was to attack the enemy in line, van to van, centre to centre, and rear to rear, to break through the opposing line, prevent retreat, and fight to a finish on the lee side. His ships were to pass through the intervals in the French line, but the approach was slow, and the order could not be completely executed.

The Bellerophon, Russell, Royal Sovereign, and other ships attacked to windward, and several French ships thus slipped or were driven away. The Marlborough and Queen Charlotte, the latter Howe's flagship, broke through the line, and delivered their broadsides with shattering fire. Captain John Harvey, in the Brunswick, endeavoured to drive through the French line, but brave Captain Renaudin, in the Vengeur, stopped his way and the two ships were locked together in a furious struggle which has become famous, until the Vengeur, swept and broken by fire, went down with all her company.

At every point the action was fought with the utmost gallantry and resolution on both sides. Six prizes remained in English hands, and the success, if not decisive, was enough. For two years to follow there was no great action at sea.

The French, too, claimed a victory, for their fleet, damaged as it was, had not been destroyed, and their convoy reached Brest in safety.

**John Leyland**

**First Republic.** Name given in France to the period from 1792 to 1804. On Sept. 21, 1792, the convention declared the monarchy at an end and the country a republic. This lasted until May, 1804, when Bonaparte was declared emperor. See French Revolution; Napoleon.

**Firth.** Name given to the narrow inlets or arms of the sea found on the coasts of Scotland. Most of them are estuaries or gulfs into which rivers discharge themselves, e.g. firths of Clyde, Tay, and Forth, but Pentland Firth is a broad strait or channel. Firths are, as a rule, valleys which have been flooded by the sea owing to the subsidence of the land.

**Firth, SIR ALGERNON FREEMAN** (b. 1856). British manufacturer. Born Sept. 15, 1856, the eldest son of Sir Thomas Freeman Firth, Bart., he entered his father's business, T. F. Firth & Sons, of Heckmondwike. In 1909 he became its head, succeeding in the same year to the baronetcy. Sir Algernon became known as a spokesman of business interests, specially during 1912-13, as president of the association of chambers of commerce.

**Firth, SIR CHARLES HARDING** (b. 1857). British historian. Born in Sheffield. March 16, 1857, he was educated at Clifton and Balliol College, Oxford. He devoted himself to historical work, became fellow of All Souls College, 1901, and was chosen in 1904 to succeed York Powell as regius professor of modern history at Oxford. He edited Ludlow's Memoirs, 1894, The Clarke Papers and The Memoirs of Colonel Hutchinson; wrote monographs on Cromwell, 1900; and Cromwell's Army, 1902; and continued S. R. Gardiner's unfinished history of the Commonwealth and Protectorate. This work and his contributions to The Dictionary of National Biography have thrown much light on the middle decades of the 17th century. His other works include Scotland and the Commonwealth, 1895. He was knighted, 1922.

**Firth, MARK** (1819-80). British manufacturer. Born at Sheffield, April 25, 1819, he was the son of an artisan in the steel industry. In 1833 he began to follow the same calling, and in 1843 his father, brother, and himself together opened a steel furnace. Mark was the moving spirit of this enterprise, and soon made it one of the largest concerns in Sheffield. The Norfolk Works were built to cope

with the increasing business, while others were erected outside the city. Firth died Nov. 28, 1880. Known as a philanthropist, he built almshouses at Rammoor, and founded Firth College, the nucleus of the university of Sheffield.

**Firuzkuh.** Province of Persia. It lies in the Elburz Mts., and its chief town, of the same name, is situated about 90 m. E. of Teheran. Pop. 5,000.

**Fisc** (Lat. *fiscus*, treasure chest). Term used in England in the Middle Ages for what is now the treasury, the account into which the public revenues are paid. From it comes the more familiar word fiscal. See Fiscus.

**Fischart, JOHANN** (c. 1545-90). German satirist. He was born in Alsace, and studied at Worms. He travelled in Holland, England, France, and Italy, and studied law in Strasbourg; he had already published some of his lampoons and satires against the Jesuits and others, and a free rendering of Gargantua into German, 1575, when he was appointed magistrate at Forbach, near Saarbrücken, 1583. Under various pen names, Fischart did good service to the Lutheran movement. The best known of his reprinted works is the simple verse narrative Das Glückhafte Schiff von Zürich (The Lucky Boat of Zürich), 1576.

**Fischer, JOHANN GEORG, VON** (1816-97). German poet and dramatist. He was born, Oct. 25, 1816, at Gross-Süssen, Württemberg. Having studied botany and literature at Tübingen, he was in 1846 appointed professor at the Stuttgart Oberrealschule. In 1854 he published his first volume of poems, and in 1896 his last, Mit Achtzig Jahren (In my eightieth Year). He also published some dramas, notably Saul, 1862; and Kaiser Maximilian von Mexiko, 1868. His lyric poetry is characterised by natural beauty and exalted tone. He died at Stuttgart, May 4, 1897.

**Fischer, KUNO** (1824-1907). German philosophical writer. Born at Sandewalde, in Silesia, after studying at Leipzig and Halle, he became a tutor at Heidelberg, but owing to his advanced ideas was compelled to discontinue his lectures. For 16 years he was professor at Jena, and in 1872 succeeded Zeller as professor of philosophy at Heidelberg, where he died. A modified Hegelian in his views, he did much to popularise Kant. His greatest work, History of Modern Philosophy (latest ed. 1897-1904), is distinguished by lucidity and brilliancy of style and by wide knowledge.

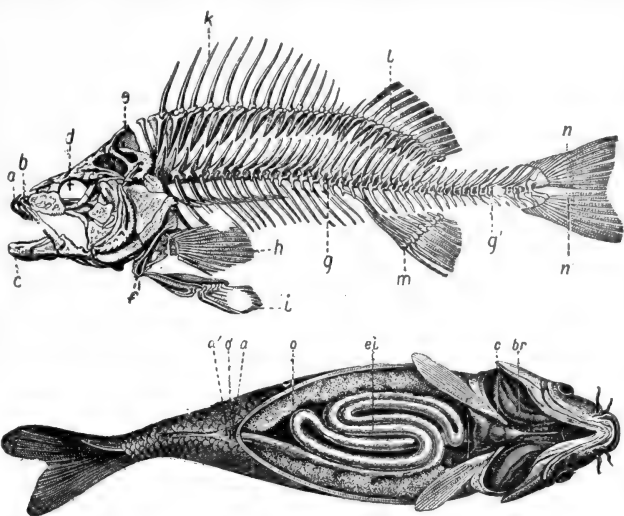
Parts of it have been translated into English: Commentary on Kant's Critick of Pure Reason, J. P. Mahaffy, 1866; Descartes and his School, J. P. Gordy, 1887; A Critique of Kant, W. S. Hough, 1888; Life and Character of Benedict Spinoza, Frida Schmidt, 1882.

**Fiscus.** Latin word, meaning a purse, which came to be applied to the treasury of the emperor in ancient Rome, as opposed to the aerarium (*q.v.*), the treasury controlled by the senate. As the power of the latter declined, the fiscus gradually became the state treasury for the whole empire, the functions of the aerarium being ultimately limited to the municipal finances of Rome.

**Fiset, SIR JOSEPH EUGENE** (b. 1874). Canadian surgeon and soldier. Born at Rimouski, March 15, 1874, he was the son of Hon. J. B. R. Fiset, a senator. Educated at Rimouski, and Laval University, he completed his medical training in London and Paris. Having joined the Canadian militia, Fiset served with the Canadian contingent in S. Africa. In 1903 he was given the D.S.O. and reached the rank of colonel. From 1903-6 he was director-general of medical services, and in 1906 he was made deputy-minister of militia and defence. As such, he had much to do with equipping the Canadian forces for service in the Great War. In 1917 he was knighted.

**Fish.** One of the phyla or subkingdoms of the animal world. Fishes may be defined as cold-blooded vertebrate animals, living in water, and breathing by means of gills. In a few cases a primitive lung is present, and the fish can breathe air directly. The limbs, when present, are modified into paired fins; there are also unpaired fins which consist of folds or outgrowths of the skin. The body generally tapers towards the extremities, and is specially adapted for rapid passage through the water with the minimum of resistance. Sometimes the body is greatly flattened—either vertically, as in the rays, or laterally, as in the sole and turbot. In nearly all the genera the heart has two chambers and contains venous blood only. With few exceptions fishes reproduce their kind by eggs which are deposited in the water and fertilised by the male after they leave the body of the female, though a few species bring forth living young.

Fishes are found in all waters, both marine and fresh, and at almost all temperatures. Something like 2,300 species of fresh-



Fish. Diagrams illustrating the structure of fishes. Above, skeleton of common perch: a, pre-maxillary bone; b, maxillary bone; c, under jaw; d, palatine arch; e, cranium; f, inter-operculum; g, g', vertebral column; h, pectoral fin; i, ventral fin; k, l, dorsal fins; m, anal fin; n, n', caudal fin. Below, internal anatomy of carp: br, branchiae or gills; c, heart; ei, intestinal canal; o, ovaries; a, a', anus; a'', oviduct

water fishes are known to science; about 3,500 species are littoral; many others inhabit the seas far from land; and about 100 genera, including numerous species, have been met with in the lowest depths of the ocean.

The skeletons of fishes are in most cases bony; but in the Elasmobranchs they are cartilaginous in character. In addition to the skeleton supporting the body outline and the limbs, there are often numerous bony rays supporting the unpaired fins also. The tail, with the caudal fin, is the principal propelling instrument, the paired fins being used as auxiliaries and for steering. The unpaired fins on the dorsal and ventral sides of the body serve mainly as balancers. The scales with which the body is more or less covered are in some cases horny in character and in others bony. In the latter case they are often nearly allied to teeth in structure and contain dentine or ivory.

#### How Fishes Breathe

Fishes breathe by extracting the air contained in water, which is taken in by the mouth and passed out through the gill-clefts on either side at the hinder part of the head. In its course it passes over a series of arches or plates, abundantly supplied with blood-vessels, and the oxygen is thus brought into contact with the blood very much as in the lungs of terrestrial animals. Most fishes are well supplied with teeth, which in some

families are very numerous. They may be confined to the edges of the jaws, but are often found on the palate and even on the gill arches and in the throat. There may be both cutting teeth and grinding ones, the latter often taking the form of plates. They usually grow from the surfaces of the bones of the mouth, but are sometimes found in sockets. They are usually replaced when worn down by fresh teeth developing from behind and not from beneath.

Fishes have in most species well-developed eyes, and their power of vision is good. A few genera, found in underground streams or in the greatest depths of the ocean, are without eyes. Experiment proves that most species can hear well; and their sense of touch is highly developed, the barbels which are found around the mouth in many species being used for this purpose. Whether the sense of taste is at all developed is uncertain. In colour fishes vary greatly, from the most sombre tones to the most brilliant hues. As a rule, the upper surface is darker than the lower, an arrangement which helps to make them inconspicuous. The silvery appearance is due to the presence of minute crystals in the scales, and causes the surface of the fish to act like a mirror and by reflecting its surroundings render it almost invisible. Protective coloration is often present, notably in the flatfish, which often so exactly resemble the mud and sand that

they are very difficult to see when lying on the bottom. Many species, especially in the tropics, are gorgeously coloured and variegated to match the seaweeds and corals.

In the matter of diet fishes vary greatly, and almost everything, both animal and vegetable, that lives in the water is preyed upon by one species or another. Small crustaceans and molluscs form the most important item in the food of most fishes; but many prey on smaller fish, and others browse on the aquatic vegetation. Some swallow mud and extract nutriment from it. As a rule, the appetite of fishes is large, and some species have such expansive powers that they will even swallow other fish larger than themselves. Nearly all fish are edible, though many are coarse and indigestible and a few appear to be actually poisonous. But the poor reputation of certain species is simply due to unskilful and unsuitable cooking. Fresh-water fishes, with the exception of salmon and trout, are as a rule of muddy or insipid flavour and contrast poorly with the marine fishes.

Fishes are usually divided into four sub-classes: Elasmobranchii or cartilaginous fishes, which are now all extinct with the exception of the sharks and the rays; Holocephali or chimaeroids, of which only three genera now exist and are of very eccentric appearance; Dipnoi or lung fishes, which can breathe air and are now all extinct, with the exception of three species; and Teleostomi or end-mouthed fishes, which include all the other fishes. See Animal; Fisheries; Zoology.

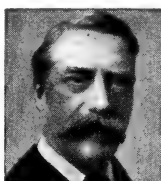
W. J. Wintle, F.Z.S.

**Bibliography.** Fishes, Living and Fossil, Bashford Dean, 1895; The Study of Fishes, A. Gunther, 1880; Marvels of Fish Life as revealed by the Camera, F. Ward, 1911.

**Fish, HAMILTON** (1808-93). American statesman. Born Aug. 3, 1808, in New York, he became a barrister in 1830. In 1842, as a Whig, he was returned to Congress, and in 1848 he became governor of New York State. In 1851 he was elected senator. After visiting Europe, he took a prominent part in the election of Lincoln. Organizing many schemes for the assistance of troops during the Civil War, Fish was also largely responsible for relief measures for the prisoners. From 1869-77 he was a secretary of state under Grant. One of the commissioners for the treaty of Washington, he was identified with many negotiations which improved the relations between Great Britain and the U.S.A. He died Sept. 7, 1893. His son, Hamilton

Fish, was assistant treasurer of the U.S.A., 1903-8, and a member of Congress, 1909-11.

**Fish, STUYVESANT** (b. 1851). American railroad official. Born at New York, June 24, 1851, the son



Stuyvesant Fish,  
American railroad  
official

of Hamilton Fish, he graduated at Columbia University. He became a clerk in the Illinois Central Rly., of which he was made director five years later, and was president from 1887-1906. From 1883-1906 he was trustee of the Montreal Life Insurance Co. of New York. He was vice-president and director of the National Park Bank, and from 1904-6 president of the American Railway Association.

**Fish Culture.** Art or industry of artificially increasing stocks of food fish, both fresh-water and marine. Ponds or stews for fresh-water fish have been common from time immemorial. The Chinese have cultivated fish for thousands of years and still lead the world in the amount of fresh-water fish bred for food. At the beginning of the Christian era every wealthy Roman had his *piscinae* or fish ponds.

So far back as the Saxon epoch large landowners had stews for carp, pike, perch, bream, eels, etc. In Domesday Book ponds are mentioned which were valued at five to twelve shillings yearly, representing at least twelve times the value of a similar area of agricultural land at that date. In 1275 Parliament passed a stringent Act punishing poaching and injury to ponds, and somewhat later the 52 Plowden Ponds of Ashton, Northamptonshire were said to be capable of producing a ton of fish weekly.

#### French and German Methods

On the Continent fish culture never fell into disuse as it did in Britain. France possesses fresh waters devoted to fish farming, of a total area of nearly 500,000 acres, while in Germany every town or village where running water is obtainable has its fish ponds or stews. In Germany, as a rule, three or more ponds are constructed in line along the course of a brook, and while two are filled with water holding fish, the remainder are drained and the beds cultivated. This method pays doubly in that the cultivated ponds, when refilled, supply a stock of insect food for the fish, while the drained ponds make rich soil for gardening purposes.

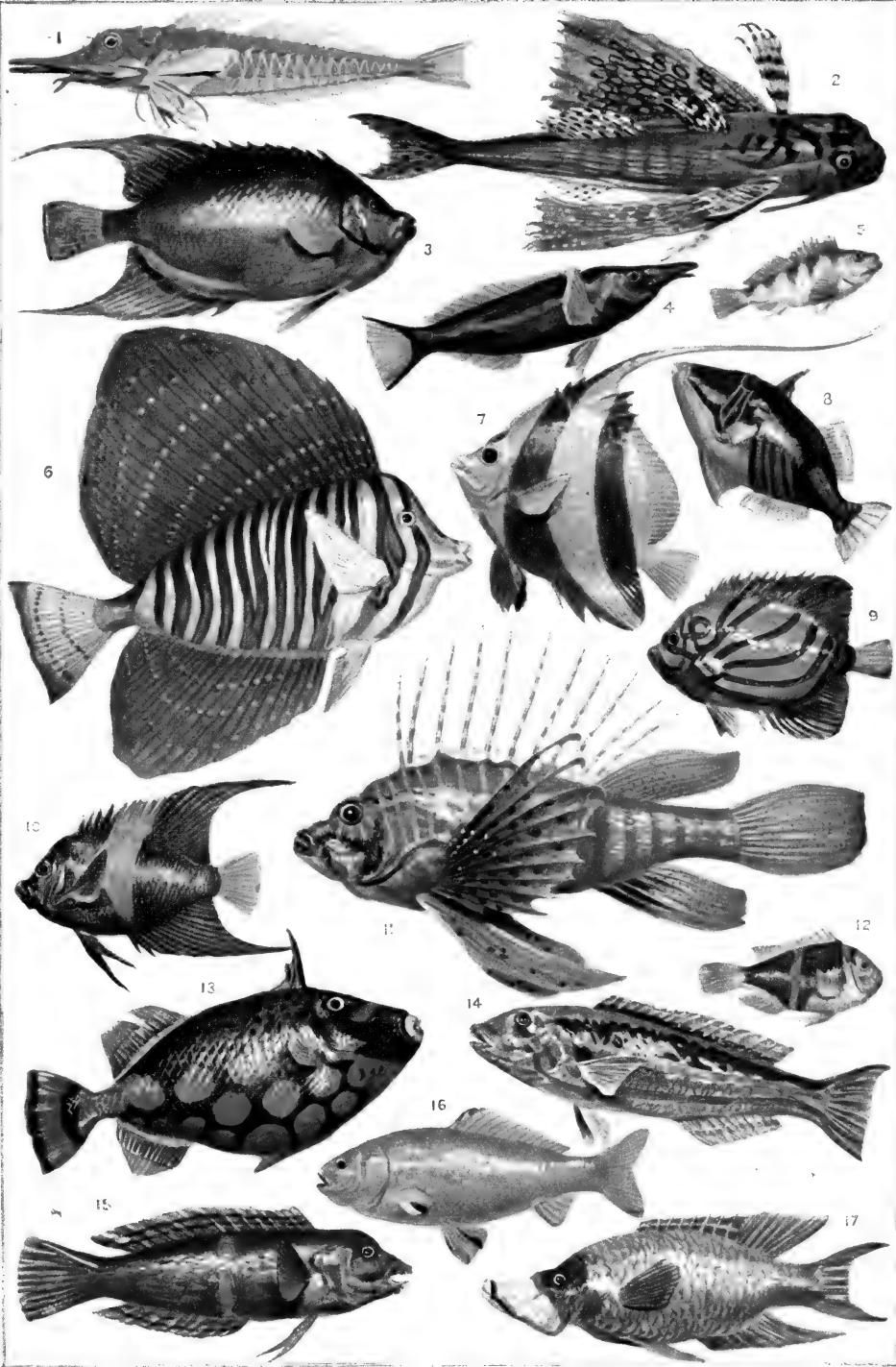
The culture of coarse fish is comparatively simple. It is merely necessary to place the ova or young fish in the pond or lake and leave them to increase and multiply naturally. In a pond which is supplied with fresh water from springs or a brook, perch, tench, roach, bream, barbel, and pike will flourish. For a stagnant pond, carp, German carp, and eels are the only fish suitable. From the beginning of the food shortage caused by the Great War, the British government did all in its power to stimulate fresh-water culture in Britain, especially that of eels. The fisheries department supply elvers, that is young eels, at a moderate price to all individuals who desire to stock ponds.

The fish hatchery for salmon and trout was established in 1853 at Stormontfield, near Perth, on the Táy. It consisted of a series of open-air breeding boxes capable of containing half a million ova. A number of fish hatcheries were afterwards formed in different parts of the kingdom, in which are reared salmon, brown trout, Loch Leven and rainbow trout. These are sent to all parts of the world.

#### Spawning and Hatching

The spawning fish are netted when on the spawning beds. By gentle pressure the eggs are removed from the female and are then fertilised with the milt of the male. The fecund eggs are carefully conveyed to the hatchery, and placed in shallow trays or boxes through which flows a gentle current of pure water. When hatched, the small fish are kept in the boxes until the yolk sac is absorbed and are then turned out into ponds, or into the open river itself. In pure and scrupulously clean water the proportion of ova safely hatched is as high as 95 p.c. In the U.S.A. the government has established salmon hatcheries on a large scale on the Pacific Coast and at present something like 300,000,000 young salmon are liberated every year.

The stock of salmon in a river can be largely increased by improving the means of access to the upper water by constructing salmon ladders at spots where there are falls, to enable the fish to reach their spawning grounds more easily. By an outlay of £2,000 the duke of Sutherland doubled the fishing value of the Helmsdale river. The question of the close time for nets is also important as regards the increase of salmon. The stock of fish in a trout stream and the size of the trout can be largely increased by deepening the pools by means of rough stone dams. These dams,



1. *Peristedion cataphractum*, European seas. 2. *Dactylopterus volitans*, Mediterranean and tropical Atlantic. 3. *Holacanthus ciliaris*, Atlantic coasts of tropical America. 4. *Gomphosus coeruleus*, Indian Ocean. 5. *Cirrhites cinctus*, Indian Ocean and West Pacific. 6. *Acanthurus velifer*, Polynesia. 7. *Henochus macropterus*, Indian Ocean and Malay Archipelago. 8. *Balistes aculeatus*, tropical seas. 9. *Holacanthus annularis*, Malay Archipelago.

10. *Holacanthus asfur*, Red Sea. 11. *Pterois miles*, Red Sea and Indian Ocean. 12. *Amphiprion chrysogaster*, Indian Ocean. 13. *Balistes conspicillum*, Indian and Pacific Oceans. 14. *Julis trilobata*, and 15. *Coris aygula*, Red Sea, Indian and West Pacific Oceans. 16. *Cyprinus auratus*, China Sea. 17. *Epibulus insidiator*, Indian Ocean and Malay Archipelago.

# FISH: VIVIDLY COLOURED SPECIES, HABITANTS OF MANY SEAS

*Specially drawn, to approximately one-sixth natural size, by J. F. Campbell*





called "croys" in Scotland, are particularly valuable in swift rocky or moorland streams where there is not any great accumulation of silt or mud.

Flat fish, such as plaice, sole, and turbot, are being reared in large numbers by the Scottish Fishery Board at ponds on the shore of the bay of Nigg, near Aberdeen, and elsewhere. The Norwegian government liberates yearly hundreds of millions of young cod hatched in salt water ponds. On the W. coast of France there are a number of brackish ponds, where salt-water fish are not only hatched but raised to maturity for the market. It is there that the curious fact was first discovered that plaice, dabs, and several other species of flat fish will fatten as rapidly in water that is almost fresh as in tidal ponds. The Fish Commission of the U.S.A. practises the artificial rearing of marine fish on the greatest scale. Shad, in particular, are reared in millions, and the artificial propagation of lobster is pursued with great success. See Close Time.

#### T. C. Bridges

**Fish Curing.** Curing, drying, pickling, or otherwise preserving fish. The curing of cod, mackerel, and herring are the most important branches of the industry in Great Britain, and the methods employed in large Scottish curing-yards are typical. Cod are gutted and bled as soon as they are caught, being carefully packed in boxes, or otherwise protected from the sun and air.

As soon as the fish have been brought ashore, the heads are cut off and the fish carefully cleaned by being brushed in fresh water, and then split. The backbone is cut about 20 joints from the tail. The fish are then washed in salt water, and the black lining membrane removed. They are then pickled in covered vessels, the proportion of salt allowed being about 50 lb. to 100 lb. of the dried, cured fish. In packing the fish into barrels a particular method is adopted, as a result of which the lighter side of the fish is uppermost, until the top layer is reached, when the dark side is placed upmost. Two fish make a layer in the barrel. In 1913 the amount of dried codfish in Scotland was 161,722 cwt., from which 3,279 barrels of pickled cod were obtained, and over 120,000 cwt. of smoked cod.

Mackerel should be split, cleaned, and salted as soon as possible, because this fish soon becomes soft and flabby. The fish are cut with a clean, sharp knife down the back from head to tail. The intestines

are extracted, the gills removed, and the blood expressed. The fish is then washed in three stages, the first merely a quick swill, the second a short soaking, and in the third the fish are left in clean water for about an hour. Finally, the mackerel are reamed and salted, the reaming consisting of the making of a shallow cut from the bottom of the belly to the head. Salting is done as quickly as possible, sufficient salt being used to cover every part lightly, the fish then being transferred to a barrel in which enough salt is placed between the layers to prevent actual contact between fish and fish. The pickle, which consists of clean salt water or clean fresh water with salt added, is put in until the barrel is quite full, and in this the mackerel are left five or six days. After this the mackerel are re-packed into the final shipping-barrel.

Herring curing is carried on on a very large scale in normal times in Great Britain. As a rule only the large and medium fish are used. Curing commences directly the herrings are emptied into the farland, a large oblong box about 2 ft. high, with inward sloping sides and ends to allow the gutters to work more conveniently. As the fish are emptied into the farland, platefuls of salt are thrown on to them at once. A light sprinkling is sufficient if they are to be gutted immediately, a more heavy sprinkling if they are to be left all night. The women gutters stand usually at one side of the farland and work with great rapidity. A sharp-bladed knife is inserted through the gills, with the edge towards the worker. By means of a sharp movement the gills and the stomach, etc., are completely removed. The gutted herrings are then salted until every fish has come into contact with the salt.

The herrings are packed tier by tier, the heads to the sides of the barrel, the tails meeting or overlapping, the middle herring being placed in front of the tails of the last two, then two more with their heads to the sides of the barrel, this being repeated until the tier is complete. Salt is sprinkled between the tiers. One barrel of salt is usually necessary to cure three barrels of herrings. The herrings are packed a little above the level of the barrel at first, as they sink a little in the salt. On the following day the barrels are filled up to the level, the ends put in, and the barrels laid on their sides. They are left in this way for eight or ten days. They are then bored in the bilge, set on their ends, and the pickle is run off through the bung-

hole. In normal times the herring-curing business can be seen on a large scale in Shetland from the beginning of May until the middle or end of Sept., and on an average, in normal years, 100,000 barrels are sent annually from Shetland to Petrograd alone. See The Art of Fish-curing, R. J. Duthie, 1911.

G. Leighton, M.D.

**Fisher, Andrew** (b. 1862). Australian politician. Born Aug. 29, 1862, at Crosshouse, Kilmarnock, Scotland.



Andrew Fisher, Australian politician

He worked as a boy in the coalmines. In 1885 he emigrated to Queensland, and in 1893 was elected in the labour interest to the state legislature. In 1899 he was made minister of rlys. Fisher entered the Commonwealth parliament as M.P. for Wide Bay in 1900. In 1904 he became minister of trade and customs, and in 1907 leader of the labour party. As such he was prime minister for a few months in 1908-9. In 1910 the labour party returned to power, and he was prime minister until 1913, when his party was defeated. Fisher returned to power in 1914, and he was premier when the Great War broke out. In Oct., 1915, he resigned the premiership to become high commissioner for the Commonwealth in England resigning in 1921.

**Fisher, Herbert Albert Laurens** (b. 1865). British historian and politician. Born in London,



Herbert Fisher, British historian

March 21, 1865, he had a brilliant career at Winchester and New College, Oxford, of which he became a fellow. As lecturer and tutor in history he remained in Oxford until 1912, when he was chosen vice-chancellor of Sheffield university, holding that post until in 1916 he was made president of the board of education, resigning in Oct., 1922. As such he was responsible for the Education Act of 1918. He entered Parliament as M.P. for Sheffield in 1916, and in 1918 and 1923 was returned as a member for the newer English universities. In 1907 he became a fellow of the British Academy, and in 1909 delivered the Lowell lectures at Boston. Fisher's historical

books include; *Studies in Napoleonic Statesmanship*, 1903; and *Napoleon*, 1913. He became warden of New College, Oxford, in 1925.

**Fisher, JOHN** (c. 1459-1535). English prelate. He was educated at Cambridge, becoming master of



John Fisher,  
English prelate  
*After Holbein*

Michail House in 1497 and chancellor of the university in 1504. In 1497 he had been appointed confessor to Henry VII's mother, Margaret, countess of Richmond, and in 1503 became the first Lady Margaret professor of divinity. In 1504 he was made bishop of Rochester. He was a keen opponent of Henry VIII's divorce from Catherine of Aragon, was imprisoned in the Tower in 1534 for refusing to swear to the Act of Succession, and on June 22, 1535, was beheaded on Tower Hill for refusing to recognize Henry as supreme head of the Church. He had been created a cardinal on May 20. He was a zealous humanist, and was instrumental in bringing Erasmus to Cambridge. He was beatified on Dec. 9, 1886.

**Fisher of Kilverstone, JOHN ARBUTHNOT FISHER, 1st BARON** (1841-1920). British sailor. Born Jan. 25, 1841, at Rambodde, in Ceylon, he entered the navy on June 12, 1854, on board the *Victory* at Portsmouth, "penniless, friendless, and forlorn," as he wrote himself. He saw active service in the Calcutta with the Baltic fleet during the Crimean War and later in China, when he was present at the capture of Canton and the attack on the Peiho forts.

Promoted captain in 1874, he commanded the *Inflexible* at the bombardment of Alexandria, 1882. He landed there with the Naval Brigade, and was the adaptor of the armoured train, which he commanded in several engagements, receiving the C.B. for his services. In Feb., 1892, he was appointed to the board of admiralty as controller of the navy, a post which he held until Aug., 1897, when he took command of the squadron on the N. America station. Fisher returned to Europe in 1899 to represent British naval interests at the Hague peace conference. From July, 1899, until May, 1902, he was commander-in-chief in the Mediterranean, and on his return was appointed second sea lord of the admiralty.

He was largely responsible for the scheme of entry and training

for naval officers which abolished the *Britannia*, substituting the colleges at Osborne and Dartmouth, and trained executive officers, engineers, and marines together up to the rank of lieutenant, after which they specialised into the various branches. From Aug., 1903, to Oct., 1904, he was commander-in-chief at Portsmouth, and served as a member of Lord Esher's committee on national defence. He was appointed first sea lord on Oct. 21, 1904, and resigned this office in 1910.

Remarkable changes in naval organization and material were carried out in this period, due mainly to the rapid rise in strength of the German navy and to the development of naval ordnance and the science of gunnery. The British fleets on foreign stations, particularly in the Mediterranean and the Far East, were drastically reduced, and in 1907 a Home Fleet



Fisher

Russell

was formed which, two years later, absorbed all of the commissioned naval forces in home waters.

Lord Fisher, who was knighted in 1894 and created a baron in 1909, was the creator of the Dreadnought and battle-cruiser type, and the introducer of oil fuel and submarines into the British navy. His work in improving the shooting of the navy was of the utmost importance. He was specially promoted to admiral of the fleet, and was appointed in 1912 chairman of a royal commission on oil fuel in relation to the navy. He was recalled to be first sea lord on the resignation of the marquis of Milford Haven, Oct. 29, 1914.

He took steps to lay down 612 new ships of various types, many of which were designed for special work in the Baltic. He also

ordered a large number of aircraft, including the small airships often known as "blimps," which proved of great value for reconnaissance in the early stages of the war at sea. He advocated the introduction of much heavier guns, and had a battle cruiser planned which would have mounted six or eight 20-in. weapons.

In one very important matter Fisher's naval leadership was defective—he attached insufficient importance to tactical training and to the spiritual side of his profession. He provided admirable weapons, but not the staff to use them to the best effect, and he never properly understood the necessity of a staff in modern war.

He strongly opposed the Dardanelles expedition, and was with difficulty prevented from resigning when it was ordered, early in 1915, by the Cabinet. He finally resigned on May 15, 1915, on the ground that ships required by the Grand Fleet in the North Sea were being imperilled at the Dardanelles. Though publicly censured by the Dardanelles committee for his conduct, he refused to defend himself.

In the general conduct of the war he was successful; the decisive result of the battle of the Falkland Islands, Dec. 8, 1914, was entirely due to his action in sending two battle cruisers secretly from the North Sea, despite the opposition of the Cabinet and the British commanders in home waters. In July, 1915, he was appointed president of the board of invention and research. He died July 10, 1920, retaining to the last his vigour of mind and speech. His letters to *The Times* in 1919-20 were memorable for the refrain "sack the lot," and he always spoke of himself as "ruthless and relentless." Yet he had a warm heart and never bore malice to a fair critic. Beyond question he was one of the great figures of his age, and did much to achieve the British victory.

H. W. Wilson

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**Fisher, SIR NORMAN FENWICK WARREN** (b. 1879). British civil servant. Born Sept. 22, 1879, he was educated at Winchester and Hertford College, Oxford. He was private secretary to Sir Robert Chalmers, 1908-10, and a special commissioner of income tax, 1910-13. He was on the National Health Insurance Commission, 1912-13, and a commissioner of inland revenue in the latter year. Deputy chairman of the board of inland revenue, 1914-18, he was chairman

from 1918 until Aug., 1919, when he succeeded Sir John Bradbury as permanent secretary of the treasury. His signature succeeded that of Bradbury on the currency notes.

**Fisher, WILLIAM MARK.** British-American artist. Born at Boston, U.S.A., of American and Irish parents, he studied art in Paris when 20 years of age, and after a brief sojourn in America, settled in England. He was elected A.R.A. in 1911, and R.A. in 1919. His subjects are rural scenes, mostly taken from the Essex country in which he lived.

**Fisher, SYDNEY ARTHUR** (b. 1850). Canadian politician. Born at Montreal, June 12, 1850, he was educated at the high school, and at McGill University. He then went to Trinity College, Cambridge, where he studied agriculture, and later became a farmer at Knowlton, Quebec. In 1882 Fisher was elected for Bromo to the Dominion House of Commons, and was minister for agriculture, 1896-1911. He was largely responsible for the reorganization of the civil service by introducing new rules with regard to entrance by a system of competitive examination.

coast—salmon, halibut, flounders, and cod. In the Mississippi River, carp, and in the Great Lakes, lake herring are caught.

**BRITISH FISHERIES.** The edible fish included in the statistical returns of Great Britain are obtained from such widely separated spots as N. Scotland and the Bay of Biscay, the Porcupine and Rockall Banks of the Atlantic Ocean, and the coasts of Denmark, Holland, Norway, and Shetland. During the past 30 years the industry has seen the disappearance of the old fishing smack in favour of the powerful and fast steam trawler, together with improvements in the gear and machinery employed, and the introduction on a large scale of ice for preserving the fish. Thus fish can now be brought from far greater distances than was formerly the case, and trawlers can remain at sea for one or two weeks before landing their catch.

The position of Great Britain as an island has given her an unique advantage in the industry; and the enormous figures given in the official returns suggest either that the quantity of fish must seriously diminish as time goes on, or else that the supply is inexhaustible. The latter is probably the truth, provided that the fish get fair treatment. The reason is biological, the extraordinary power of reproduction possessed by fish. A herring produces from 20,000 to 30,000 annually—a small figure compared to turbot and cod, and some others, which produce millions. This fertility explains why, for example, it is possible for the Scottish herring fishery alone to handle about 1,000,000,000 fish annually.

#### Experimental Conservation

Fishermen do little or nothing towards the conservation of their catch. The few efforts made to restock the sea are experimental, and negligible from the point of view of the total result. In the period preceding the Great War, there were some 80,000 men and boys engaged in the fishing fleets of Great Britain, excluding Ireland, entirely engaged in catching and landing fish, and not in any way producing them in the sense that the farmer produces meat.

**EDIBLE FISH.** From a theoretical point of view any fish which is wholesome food would be considered edible; but a number of the smaller fishes found along the sea-shore are commercially to be ignored. Different countries have different tastes. For example, the bass is highly esteemed in Constantinople, and grows in Turkish waters to a much larger size than

## FISHERIES: THE INDUSTRY & ITS GROWTH

Gerald Leighton, M.D., Inspector, Scottish Board of Health

*Additional information on the subject of fisheries will be found in the articles on the various fish, e.g. Cod; Herring; Mackerel, etc. See also Trawling and the articles Fish Culture; Fish Curing, etc.*

Dwellers upon coastal margins have always depended to a large extent upon their skill as fishermen for their sustenance. In modern times, however, the world's fisheries mean more than the catching of local fish for local needs. As knowledge of fishing areas has become greater, and methods of catching have developed, the industry has taken a prominent position in world commerce.

Methods of preservation and treatment have caused fish to be distributed all over the world, even to the interior of continents, where fish food, unknown previously, is to-day common. In this advance the processes of drying, smoking, refrigerating, and canning have played an important part.

#### Pelagic and Deep Sea Fish

Marine fish may be divided into shore, pelagic, and deep sea fish. The shore fish live either on or just under the surface of the water close to the land. Some are confined to shallow coasts with sandy bottoms, others to rocky coasts. Pelagic fish live near the surface of the open ocean, and only come near the shore for spawning or food. Most of them spawn in the open sea. They roam over large areas, either in virtue of their strength as swimmers or by the aid of ocean currents.

Deep sea fish live in the depths, where light, temperature, and movement are but little felt. These groups cannot be separated by hard and fast lines. They merge gradually, and fish probably change from one to the other. These changes are occasioned by the search for food. Thus the surface of the sea near the shore sometimes contains numerous small crustaceans, or molluscs, upon which fish in the open ocean feed.

The latter, therefore, come close into shore, pursued in their turn by other large fish which prey upon them. Edible fish all come within the groups of shore or pelagic fishes.

#### European Fisheries

Of the principal European fisheries, the shore fishing of France includes herring, mackerel, sardines, anchovies, sprats, tunny, salmon, sturgeon, and oysters. The deep sea fisheries, including those from Iceland, the North Sea, and Newfoundland, are mainly those of the cod, but include herring and mackerel. German fishing vessels land their fish on the coasts of the North and Baltic Seas, the most important being cod, haddock, coal-fish, whiting, plaice, lemon sole, ling, and herring. Holland's vessels land principally herring, plaice, flounders, anchovies, and smelts. The chief fishery of Belgium is of the inshore kind, and that of Denmark consists of flat fish, eels, herring, and cod. Of the produce of the Portuguese fisheries, more than half is sardines.

The Norwegian fisheries are by far the most important of the European fisheries, and have steadily increased in value during recent years, cod and herring being the first on the list. In 1915 the value of the fish landed rose to over £10,000,000.

Newfoundland's chief catches are cod, herring, and whale. The Canadian fisheries embrace cod, the largest quantity, followed by salmon, hake, pollack, halibut, haddock, white fish, sardines.

The main fisheries of the U.S.A. are: (1) on the Atlantic—herring, cod, alewives, haddock, hake, pollack, shad, flounders, halibut, mackerel, menhaden, and mullet; (2) in the Gulf of Mexico—mullet and snapper; (3) on the Pacific

in British waters. In Great Britain it is much neglected, possibly because it requires to be caught with hook and line, and then only in restricted districts. Pollack, again, is caught in large quantities on the line off Cornwall and other places, but it does not pack well, or keep well, and is thus neglected. Skate and ray, until recent years, were not seen in the fishmongers' shops nearly so much as they are now, but are highly esteemed in French restaurants. Other fish are consumed almost entirely in or near the locality of their capture, among them the coal-fish and cat-fish of Scottish waters, the pollack and pilchard of Cornwall, the conger, the dog-fish, and weever of Sussex.

#### Landings in England and Wales

In 1913, the last completed year before the Great War, the total landings of fish in England and Wales reached a maximum, while in Scotland the quantity was less than that of the previous year, though of greater value. For the 11 years, 1903-13, the quantities and value of fish landed in England and Wales were as follow:

Years	Fish (exclusive of Shell Fish)		Shell Fish		Total Value	
	Cwts.	£	£	£	£	£
1903	11,198,000	6,930,000	279,000	7,209,000		
1904	11,365,000	6,490,000	290,000	6,780,000		
1905	11,310,000	7,201,000	302,000	7,503,000		
1906	12,195,000	7,641,000	324,000	7,965,000		
1907	13,994,000	7,826,000	329,000	8,155,000		
1908	13,282,000	7,748,000	294,000	8,042,000		
1909	13,955,000	7,497,000	263,000	7,760,000		
1910	14,118,000	7,966,000	228,000	8,194,000		
1911	14,119,000	8,051,000	273,000	8,324,000		
1912	14,612,000	8,884,000	327,000	9,211,000		
1913	16,152,000	10,000,000	328,000	10,337,000		

The total landed showed an increase, largely attributable to the record catch of herring in 1913, of 44 p.c. on that of 1903, and of 10·5 p.c. on that of 1912. The E. coast contributed about 92 p.c. of the pelagic fish.

**MARKETING.** The placing of fish upon the market involves first the production and catching of the fish, and, secondly, the means of distribution. The catching is done either by nets, baited hand-lines, or traps, the latter used especially for shell-fish. The nets are the trawl, the drift-net, and the trammel. Commercial distribution bears little relation to the natural distribution of the fish in the sea. Thanks to improved methods of transport, and ice-packing, thousands of tons of fish are brought a thousand miles to be sold at Billingsgate. Much of this is collected in the fishing grounds themselves by fast steamers. This is known as the "fleeing system." About 40,000 tons per annum is brought to the Thames every year in this manner.

Fish caught in trawl-nets are dead when brought on board, and must be packed in ice. The same thing applies to fish caught on lines, only hauled up at long intervals.

Other fish, such as cod and halibut, which are hauled up by hand-line as soon as hooked, can be kept alive in salt water until reaching their destination, a process which is somewhat cruel, and, moreover, does not conduce to keep the fish in good condition. Marine fish really keep better if they are killed as soon as they are caught, gutted at once, then washed and salted. The great bulk of the fish in Great Britain, probably about 1,000,000 tons per annum, is distributed by rly., and the various rly. companies have special departments for dealing with the fish traffic alone. How complicated the whole question of distribution and cost is, may be realized from the fact that (as F. G. Affalo says) "a slice of turbot eaten in a London club may have been caught in the Bay of Biscay, then brought on ice to Plymouth Barbican, sent by S.W. Rly. to Waterloo, thence by van to

Billingsgate, and finally by cart to the Bond Street shop from which the club buys it."

**INSPECTION.** Fish come under the notice of the food inspector, whose duty it is to see that

no fish are exposed for sale unless they are of sufficient freshness to be good for food. Absolute freshness is desirable in fatty fish, such as mackerel, herrings, and eels, but the firmer cod and turbot eat better the day after they are caught. Purchasers should avoid fish which are bruised, as often happens to those caught in a trawl.

It is by no means easy to tell a perfectly fresh fish. The sense of smell is an unsatisfactory test, being more acute in some people than in others, and, moreover, a fish may be fresher or staler than its smell suggests. Frequent washing of the fish, as is carried out on the slabs of many fishmongers, keeps away the smell. Well-marked dullness in the eyes of the fish is a reliable test for freshness, but sets up a somewhat high standard, because the eyes become dull in 24 hours, and decomposition may not set in for much longer.

Another test is that of the rubbing off of the scales. If this can be done with ease the fish

should not be eaten. The same remark applies to fish whose flesh comes readily off the back bone. The gills in a fresh fish are red, but the exact colour differs in different species. Thus, the gills of the whiting and the haddock are not as dark in colour as those of the salmon. After 24 hours the gills lose their fresh red colour, though frequent washing tends to retain it. If the fish be held out by the hand and remains horizontal without drooping, it is a sure sign of freshness. As staleness comes on, the body becomes more and more limp, before there is any really unpleasant smell. This stiffness, or *rigor mortis*, sets in about twelve hours after death, and may last for another 24 hours, or even longer in fresh fish placed on ice at once. These tests are used by experienced inspectors.

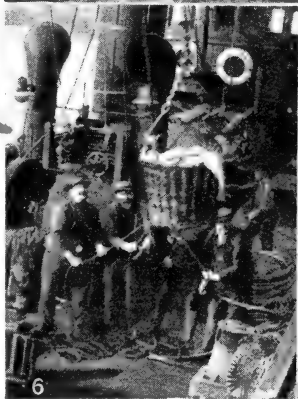
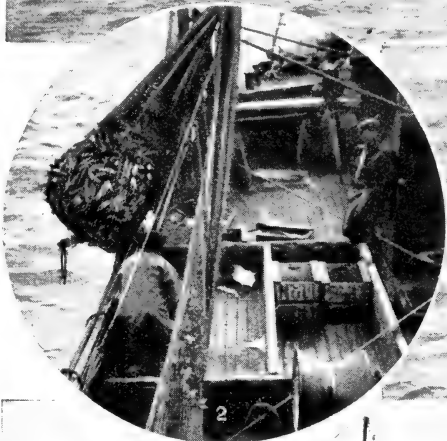
Finally, one may just note that cod should be very firm to the touch; skate should be thick, firm, and the flesh pure white; eels should be bought alive; whiting deteriorate quickly; the flesh of turbot is not pure white; herrings show redness about the head when fresh, but in mackerel this redness indicates decay. It should be noted that certain frauds are perpetrated by unscrupulous salesmen on ignorant purchasers. The street-hawker often sells slices of halibut as turbot, not showing the whole fish. The skinned weever is also sometimes sold for sole, and lemon soles frequently as soles. It is a good rule never to buy a portion of fish unless the skin is on it.

#### Fish in Season

Cookery books and calendars usually contain tabulated lists of edible fish in season, but many of these lists are misleading. Strictly speaking, there is no season in which any fish should not be sold for food, except from a legal point of view. Speaking generally, it may be said that a fish is at its best at the half-spawn period, i.e. when the roe is about half ready for depositing. Some fish, however, are at their best in full roe. Immature fish, on the other hand, i.e. fish too young to spawn, are never out of condition, but should be avoided for the sake of conserving the supply.

Fish are brought to the markets from such great distances that it becomes more and more difficult to define their seasons. Thus it used to be considered that the winter was the proper season for cod, but excellent cod may now be got during the summer. Soles may be had in good condition all the year round, but plaice are inferior





1. The fleet at work off the Dogger Bank. 2. A netful of cod being hauled aboard. 3. A normal catch. 4. Taking a load in a small boat to the carrier. 5. Passing fish into the hold of the carrier. 6. Unloading the carrier at the quay. 7. Packing in tubs. 8. Packing haddock in boxes

**FISHERIES: SCENES AND INCIDENTS IN THE WORK OF THE NORTH SEA FISHING FLEET**

during the first three months of the year. The season for herring and other migratory fish is determined by the time of year at which they come within reach of the trawlers. Salmon are protected by special laws. (See Close Time.)

Speaking generally, it is illegal to buy or sell British salmon from Sept. 3 to Feb. 1, but the law applies to fresh salmon only, not to cured fish. Mackerel and whiting are at their best in the cold months, because they do not keep well in warm weather. If perfectly fresh they are also in season in the summer. Oysters are usually avoided from May to August, and are not very good even in Sept. Lobsters are always in season, as far as fitness for food goes, but the females are protected in most places while carrying the eggs. The legal seasons for fish are usually posted up in all fish markets.

**Fisherman.** The term usually applied to one who earns his living by fishing in the sea. From the earliest times off-shore fishing has been the principal occupation of dwellers on the sea coast, while trawling and deep-sea fishing have largely developed with the introduction of steam and of wire hawsers. Fishing in streams and rivers is usually called angling (*q.v.*), and is subject to various restrictions. See Angling; Close Time.

**Fisher's.** Island of the U.S.A. Situated at the E. end of Long Island Sound, it forms a part of Suffolk co., New York. It is about 8 m. long by 1 m. broad. It is frequented as a summer resort, and the chief occupation is agriculture. Fort Wright, one of the defences of Long Island Sound, stands at the E. end. Pop. about 200.

**Fishery Board.** In Gt. Britain a body of men whose work it is to foster and protect the fishing industry. Scotland has a separate board, consisting of paid and unpaid members. Its offices are in George St., Edinburgh. In England and Wales the fisheries are looked after by the board of agriculture and fisheries, and in Ireland by the department of agriculture and technical instruction. In Nov., 1919, the fisheries department of the board of agriculture was placed under the direct control of the parliamentary secretary, who would act as deputy-minister of fisheries. The officer in charge of the department is known as fisheries secretary to the board.

**Fishguard** OR ABERGWAEN. Urban dist., seaport, and market town of Pembrokeshire, Wales. It stands on the Gwaen near its entrance into Fishguard Bay, 12½ m.

N. of Haverfordwest. The terminus of the G.W.R. on its route to Ireland, Fishguard has an excellent harbour and a fine breakwater (2,500 ft.), a coastguard and lifeboat station, and a pier constructed by the rly. co. in 1906. Slate is worked in the neighbourhood and fishing is an industry. There is regular steamer communication with Rosslare in co. Wexford, Ireland. In 1797 Fishguard was invaded by some 1,200 French soldiers, who were forced to surrender to the local yeomanry. Market day, Thurs. Pop. 2,892.

**Fish Hatchery.** Place for hatching the eggs of fish. Various fish hatcheries have been established, especially by the United States Fish Commission. This body, in 1902, hatched and set free nearly 1,500,000,000 young fish, the principal species dealt with being cod, flounders, and lobsters. In Canada the hatcheries established devote their attention mainly to cod and lobsters. In Europe hatcheries have been started in Norway, England, and Scotland, and the methods for obtaining the eggs vary in different places. See Fish Culture.

**Fish Hook.** Apparatus for catching fish. At first a flake of flint sharpened at both ends, with a thong attached to the centre, was employed for this purpose. But the antiquity of the metal hook is great, bronze fish hooks of modern shape having been found in lake-dwellings in Switzerland and elsewhere.

The modern fish hook is made of soft cast steel wire. The wire is cut into lengths and the barb formed and sharpened before the wire is

bent into shape. The shanks are then ringed or flattened, and the hooks are hardened, tempered, and scoured. Machinery performs the



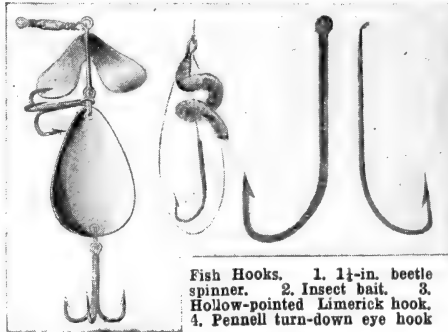
Fishguard, Pembrokeshire. Railway terminus and quay for the steamer service to Rosslare, Waterford, and Cork

various processes automatically. Hooks vary greatly in size and shape, from the huge hook with swivel and chain attachment used for catching sharks, down to the tiny-eyed hook on which the smallest trout flies are dressed. See illus. p. 1251.

**Fishing.** Art or practice of catching fish. It is divided into two main branches. Sea fishing is done chiefly by men who work at it for a livelihood, and to whose efforts are due a considerable portion of the world's food supply. In this trawling plays an important part. The other branch is known more usually as angling, and is pursued mainly by amateurs for their own amusement, although in America great quantities of salmon are caught for food by professional fishermen. Fly-fishing is a form of angling.

The chief fish caught by the professional are the cod, herring, and mackerel; by the amateur, salmon and trout. Whale fishing, seal fishing, and pearl fishing are special branches. The culture of oysters, lobsters, and other shellfish hardly falls into the category of fishing proper, although some of these are caught by those who are fishermen by trade.

Fishing is one of the oldest arts practised by man, and there are evidences that he did something of this kind 8,000 years ago. Various devices were employed, and some of the earlier forms, made of stone and bronze, have been unearthed. Further progress was made until the existing



Fish Hooks. 1. 1½-in. beetle spinner. 2. Insect bait. 3. Hollow-pointed Limerick hook. 4. Pennell turn-down eye hook

By courtesy of S. Allcock & Co.

varieties of rod, bait, and all the accessories were evolved. Close times are enforced by law, while a long series of Acts, which may be said to date from Magna Carta, lay down the law on the matter as far as the United Kingdom is concerned. Dealing with fisheries of every kind, deep sea, inshore, and inland water, they forbid the use of poison or explosives for the purpose of catching fish, make regulations about the registration and management of fishing boats, and lay down other conditions for the purpose of conserving the supplies and using them in the interest of the whole nation.

For England and Wales the law is administered by the board of agriculture, which has a special branch to deal with fisheries, while Scotland and Ireland have each their own department for the purpose. The United States, Canada, and other countries are equally vigilant in this matter. International agreements deal with areas, such as the Newfoundland banks and Bering Sea, where men of different nations come into contact. See Angling; Close Time; Fisheries; Fly-fishing; Trawling.

**Fishing Rod.** Rod employed by anglers. Used for casting the line and keeping it clear of the bank or shore upon which the fisherman is standing, the rod varies largely with the nature of the sport. Salmon fly rods, which are liable to great strain, are usually of cane with a steel rod in the centre, and measure from 16 ft. to 17 ft. 6 ins. For trout and other fresh-water fishing a lighter rod from 12 ft. to 13 ft. in length has been found the most suitable. Fishing rods are usually jointed for greater convenience, and are fitted with a reel to wind in the line. See Angling.

**Fishkill.** Town of New York state, U.S.A., now part of the city of Beacon. It stands on a creek of the Hudson, 59 m. from New York city, and its full name of Fishkill Landing throws light on its origin. One of the oldest places in the state, it has two churches dating from the 18th century, one being the building in which the congress of New York met in 1776. It was a base for the Americans during the War of Independence. It is connected by rail and ferry with Newburgh on the other side of the Hudson.

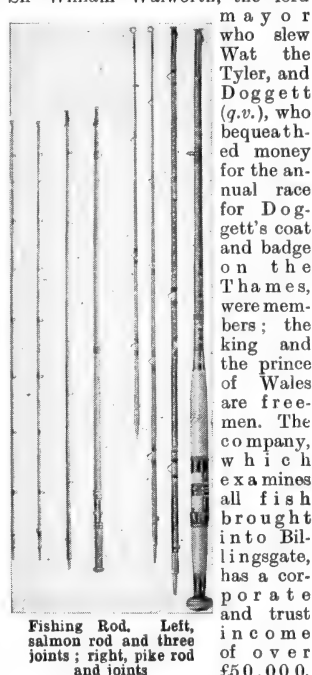
**Fish Lice.** Small crustaceans of the order Copepoda (*q.v.*), which are parasitic on fishes. They depart widely from the typical forms of the order, and are degenerate in both structure and function. The usual head appendages are modified into sucking or adhesive organs.

**Fish Measure.** Special measures of capacity used in the sale of fish. These can be summarised thus: 4 fish make 1 warp; 33 warps, a long hundred; 16 long hundreds, a long thousand; 10 long thousands (13,200 fish), a last. In addition to this 500 herrings make a code, 600 herrings a mease, and 615 herrings a maze; 37½ gallons of fresh herrings equal a cran, and 26½ gallons of cured herrings a barrel. A barrel of anchovies is 30 lb.

**Fishmongers' Company.** London city livery company. Founded to exercise a monopoly of the fish trade of London, and originally divided into two companies, Salt-fishmongers and Stock-fishmongers, its earliest extant charter is dated 1364, but the foundation fraternity of S. Peter existed in the 12th century. Sir William Walworth, the lord



Fishmongers' Company arms



Fishing Rod. Left, salmon rod and three joints; right, pike rod and joints

By courtesy of S. Allcock & Co.

Thames Street, E.C., was built in 1831-33, near the site of its two predecessors, the first of which was burnt in 1666 and rebuilt 1671. In it are shown Sir W. Walworth's dagger, an embroidered Tudor pall, and a chair made from one of the original piles of old London Bridge.

During the Great War the hall was used for the purposes of a military hospital.

**Fishponds.** Ecclesiastical district within the county borough of Bristol. In the N.E. of the city, it has a station on the M.R. It is divided into three ecclesiastical districts, All Saints, S. John's, and S. Mary's. See Bristol.

**Fish Residues.** Fish offal suitable for manufacture into various by-products. The main products are fish meal, oils from the livers of fish, and oil and manure from the intestines. Fish meal is made chiefly from the head and bones. It is a valuable food for cattle and pigs. Medicinal oil is principally the product of the livers of the cod. Other oil used in commerce and industry, especially in the process of tinning and in the manufacture of soap, is extracted from the livers and intestines of various fish. Fish manure is a valuable fertiliser, used particularly in the growing of beet.

The fish from which most of the waste material is obtained consist of herring, codfish, whiting, and haddock. A large amount of herring waste is obtained from the herrings prepared for curing, in which usually the head, the gills, and the viscera are rejected. In making kippers from herrings the gills and viscera are rejected. From the codfish the liver is always separated for the manufacture of cod-liver oil, the head, gills, viscera, and the backbone being used for by-products.

The industry is extensive in the U.S.A. and in Norway, but is still in its infancy in Great Britain, where in many fishing ports there is no provision for utilising the waste, which is emptied into the sea. Factories already exist, however, at Grimsby, Hull, Milford Haven, Falkirk, Montrose, Fraserburgh, Wick, and Aberdeen. The industry has received considerable stimulus from the shortage of the supplies of natural guano from Peru. Two kinds of fish guano are made, one from herring, the other from white fish. The former contains a large percentage of oil, which has to be extracted in the manufacture of guano, the product from the oily residues being a dark-coloured, soft fish guano. The product from the white fish is a dry, friable, light-coloured, more valuable guano. The value of fish guano depends upon its ascertained chemical analysis, the two most valuable constituents being phosphate of lime and nitrogen.

Cod-liver oil comes from the liver of that fish, the oil in white fish being accumulated in the liver

instead of being scattered throughout the flesh, as it is in the herring. Hence the livers of the cod when caught are immediately separated, kept fresh, then broken up and allowed to ferment, after which they are cooked until the oil is free, and can be run off. A certain amount of stearine is present in this cod-liver oil, and has to be separated out before the oil can be used medicinally. This is done by means of extreme cold.

**Fiske, BRADLEY ALLEN** (b. 1854). American sailor. Born at Lyons, New York, June 13, 1854, and trained at U.S. naval academy, he was promoted lieutenant in 1887. He was on the Yorktown during the affray at Valparaiso in 1891, was mentioned for services at Manila, 1898, and took part in the bombardment of San Fernando, 1899. He became commander in 1903, captain in 1907, and rear-admiral in 1911. Fiske invented many electrical naval appliances, notably a naval telescope sight, and wrote much on naval matters. See From Midshipman to Rear-Admiral, B. A. Fiske, 1919.

**Fiske, JOHN** (1842-1901). American historian and philosopher. Born March 30, 1842, he was educated at Harvard, where he became lecturer on philosophy and assistant librarian. In philosophy, especially in Outlines of Cosmic Philosophy, 1874, he did much to popularise the evolutionist theory, combined with a belief in immortality, which he supported. His historical works cover most of the development of the U.S.A. from the earliest times. He died July 4, 1901.

**Fisk University.** American educational institution. Founded in 1866 at Nashville, Tennessee, it is for the education of coloured persons and is named after Clinton B. Fisk (1828-90), American soldier and philanthropist, to whom its establishment was largely due. The teaching given at Fisk is somewhat off the ordinary university lines. Money for its endowment was raised in Great Britain by the Jubilee Singers (*q.v.*), as they were called; coloured men also gave concerts, etc., for this purpose.

**Fismes, CAPTURE OF.** American exploit in the Great War, Aug., 1918. After the Franco-American capture of Château-Thierry, July 21, 1918, the 3rd and 26th U.S. divisions swept forward towards the

Oureq and the Vesle in pursuit of the Germans. On July 28 severe fighting took place at Sergy, which changed hands several times, the New York Irish regiment holding it through the night, and the Germans recapturing it next day only to be again driven out when the Americans resumed their advance.

On Aug. 1-2 the 42nd division, with the 28th division and a brigade of the 3rd division, was close to the Vesle; it was relieved by the 4th division, which, with the 32nd division, tried to get across the river and take Fismes, but was repeatedly beaten back. The 77th New York national army division and the 28th division next made the effort, and on Aug. 4-5, by out-flanking movements which threatened the complete envelopment and capture of the German forces in Fismes, compelled the enemy to withdraw from the town. Thereafter the Americans gained ground on the N. side of the Vesle. See Marne, Second Battle of the; United States: History.

**Fissirostres** (Lat. *fissus*, split; *rostrum*, beak). Obsolete term for birds which have gaping mouths, as the swallow and the goat-sucker. As a means of classification this feature is useless, for widely separated families of birds possess it.

**Fissurellidae** (late Lat., little fissure). Family of small limpets which have a hole at the apex or margin of the shell, whence their popular names, keyhole and slit limpets. Five species are found around the British coasts.

**Fistula** (Lat., pipe). Abnormal opening between a cavity in the body and the skin, or between two cavities in the body. For instance, a communication between the rectum and bladder is termed a *recto-vesical fistula*.

**Fit** (A.S. *fitl*, struggle). Popular term for a sudden seizure, accompanied by loss of consciousness with or without convulsions. See Convulsions; Epilepsy; Hysteria.

**Fitch, SIR JOSHUA GIBLING** (1824-1903). British educationist. Son of Thomas Fitch of Colchester, he was educated there and at University College, London. He became a teacher, and in 1856 was made principal of a training college for teachers in elementary schools. In 1863 he was appointed an inspector of schools, and the rest of his working life was passed in the public service, from which he retired in 1894. When chief inspector of training colleges he was entrusted with various special duties, and from 1870-77 was an assistant commissioner of endowed schools. He died July 14, 1903. Fitch, who was knighted in 1896,

was one of the foremost educationists of his day, and wrote a great deal on the subject of education.

**Fitch, WILLIAM CLYDE** (1865-1909). American playwright. Born and educated in New York, he



William Clyde Fitch, American playwright

scored a success with his first play, *Beau Brummell*, 1890. In 1899 he produced *Nathan Hale*, an historical play dealing with the American War of Independence, and, in London, *The Cowboy and The Lady*. The *Last of the Dandies*, 1901, and *The Woman in the Case*, 1909, were also produced at London theatres. He died Sept. 4, 1909.

**Fitchburg.** City of Massachusetts, U.S.A., one of the co. seats of Worcester co. On a branch of Nashua river, 49 m. W. by N. of Boston, it is served by the New York, New Haven and Hartford, and the Boston and Maine Rlys. It contains a state normal school, several benevolent institutions, a public library, and a number of fine parks. Settled 1719, it was incorporated, 1764, and received a city charter, 1872. Pop. 42,420.

**Fitchée** (Fr. *fiché*, fixed). In heraldry a cross with a spike at its lower extremity is said to be fitchée or fitchy. It represents the proper cross of the old pilgrims and crusaders, which was stuck in the earth to improvise an altar. See Cross.

**Fitchett, WILLIAM HENRY.** Australian author and journalist. Educated at Melbourne Univer-

sity, he entered the Methodist ministry. A practical journalist, he edited *The Melbourne Daily Telegraph* and *Southern Cross*, and, being greatly interested in education, became principal of the Methodist Ladies' College. In 1897 his *Deeds that Won the Empire* attained immediate success. His other works include *How England Saved Europe*, 1899; *Fights for the Flag*, 1900; *Wellington's Men*, 1900; *Nelson and his Captains*, 1902; *Wesley and his Century*, 1906; *Ithuriel's Spear*, 1906; *The Tale of the Great Mutiny*, 1907; *Beliefs of Unbelief*, 1908; *The New World of the South*, Australia in the Making, 1913.



W. H. Fitchett, Australian author  
Elliott & Fry



John Fiske.

**Fitter.** Term used in engineering to designate the workman who assembles parts of machinery, and makes them fit. The work is highly skilled. The term is also applied in tailoring to one who takes measurements, tries on and adjusts garments. See Engineering.

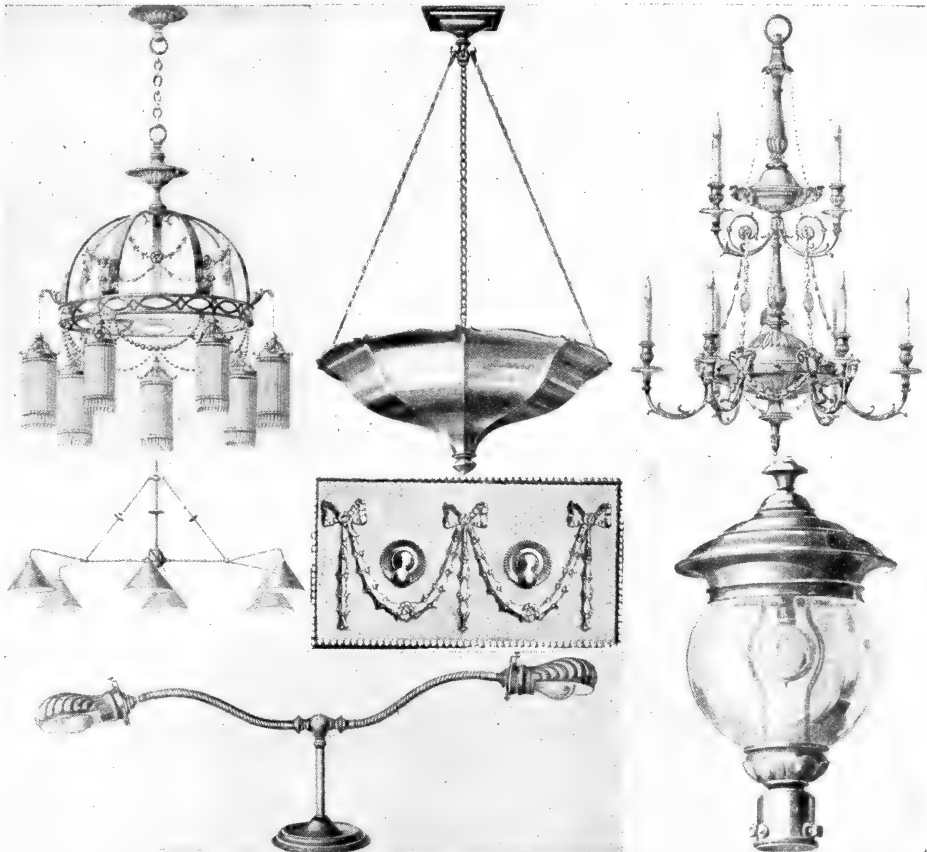
**Fittings, ELECTRIC.** Accessory to a principal electrical apparatus. Thus, an electrical glow lamp is not a fitting; but the holder into which the lamp fits, the wall plug or the ceiling rose with which it is connected, and the switch by means of which the light is turned on or off, are all fittings. The number of classes in which electrical fittings may be ranged is not very large; they are chiefly switches, wall plugs, ceiling roses, adapters or connectors such as are used to connect a lampholder to a fan or to a flat iron, cut-outs, junction boxes, lampholders, and shade carriers: all in an almost infinite variety.

Thus, under switches we have distribution boards or panels which are simply collections of switches, suspension, bracket, bolt, plate, and rotary switches; while the scale on which switches are used extends from the simple button which puts on or off a single glow lamp to the elaborate switch-board structure, which may occupy some hundreds of square feet, by which the current supplies from a great power station are controlled. Again, the ordinary glow lamp holder, which is essentially a socket provided with a bayonet joint in which the end of the lamp engages, may also be provided with a switch to put the light on or off, and this switch may be a push-bar, rotary, or chain-pull; or it may have a locking device which ensures that once the lamp is in place and locked it cannot be removed, or it cannot be turned off or on, without the authority of the person

who holds the key. Other forms as used in mines and on board ship are specially adapted to resist vibration. See Lighting, Electric.

**Fitz** (Lat. *filius*; Fr. *fil*). Old Anglo-Norman word formerly spelt *fiz* and meaning *son*. Like Scots Mac, Irish O', and Welsh ab, ap, it is prefixed to proper names to show parentage. Familiar examples are Fitzalan, Fitzgerald, and Fitzwilliam. It is specially used to indicate natural sons of royal blood, e.g. Fitzjames, duke of Berwick, son of James II.

**Fitzclarence, CHARLES** (1865-1914). British soldier. Born May 8, 1865, a son of the earl of Munster, he was educated at Eton and Wellington. He joined the Royal Fusiliers in 1886, and the Irish Guards in 1900. He served in S. Africa 1899-1900, in which campaign he won the V.C. He went to France in Aug., 1914, and commanded the 1st Guards brigade at the first



Fittings. Examples of fittings for electric lights. 1. 7-lamp electrolier. 2. Inverted pendant for reflected light. 3. Adam style electrolier. 4. 6-lamp electrolier for billiard table. 5. Switch designed in Adam style. 6. Standard desk lamps. 7. Electric lantern for public streets

By courtesy of General Electric Company



battle of Ypres, in which his leadership helped to stem the German onrush towards the Channel ports. On Oct. 31, the most critical day, he was killed in action. See Ypres, First Battle of.

**Fitzgeorge**. Name taken by the three sons of the duke of Cambridge and his morganatic wife, Miss Louisa Fairbrother, the actress, whom he married in 1840. One of them, Sir Adolphus Augustus Frederick Fitzgeorge (b. 1846), entered the navy and retired with the rank of rear-admiral. In 1904 he was knighted. Another, Sir Augustus Charles Frederick Fitzgeorge (b. 1847), entered the Rifle Brigade in 1865 and later served in the 11th Hussars. He retired as a colonel and was knighted in 1904.

**Fitzgerald**, LORD EDWARD (1763-98). Irish rebel. Son of the 1st duke of Leinster, he joined the English army, served in Ireland, and in 1781 was wounded at the battle of Eutaw Springs in America. He was elected to the Irish parliament as member for Athy, afterwards travelled in America, and in 1792 was cashiered for attending a revolutionary banquet in Paris. He joined the United Irishmen in 1796 and took an active part in the plans for the French invasion. The plot was discovered, and Fitzgerald died in prison, June 4, 1798, from wounds inflicted by one of his captors. His wife Pamela was generally, but wrongly, believed to be a daughter of Madame de Genlis by Philippe Égalité, duke of Orleans. She, who was probably born in Newfoundland, married Fitzgerald in 1792 and lived until Nov., 1831.

**Fitzgerald**, EDWARD (1809-83). English poet and translator. He was born March 31, 1809, at Bredfield House, near Woodbridge, Suffolk, the son of John Purcell, who assumed his father-in-law's name, Fitzgerald, nine years after the poet's birth. Spending his boyhood abroad, he was sent, in 1821, to a school in Bury St. Edmunds, entering Trinity College, Cambridge, five years later. He



*Edward Fitzgerald*  
After O. Humphry, R.A.



*Edward Fitzgerald*

became intimate with Thackeray and Spedding; later with Tennyson and Carlyle. On leaving the university, he spent a short time in France, but, returning to Suffolk in 1831, never left it again, for more than a week or two, till his death, June 14, 1883.

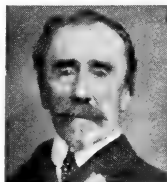
His life was that of a recluse spent among books, flowers, and music; he began the study of Spanish in 1850, that of Persian in 1853. The world-famous translation of The Rubáiyát of Omar Khayyam, preceded in 1856 by an anonymous version of the Šálmán and Absál of Jami in Miltonic verse, was first published in Jan., 1859; but lay for months neglected, even by the translator's own friends, until Rossetti discovered it in the fourpenny box of a second-hand bookseller, and Swinburne proclaimed its genius to the world. A second, greatly revised, edition appeared in 1868, and its subsequent popularity has been phenomenal. Fitzgerald also published Euphranor, a Platonic Dialogue, 1851; Six Dramas of Calderon, 1853; a version of the Agamemnon, 1876; two Oedipus Tragedies, 1880-81; and Readings in Crabbe, 1882. The dedication of Tennyson's Tiresius to "Old Fitz" advanced Fitzgerald's personal reputation, but it was not till W. Aldis Wright brought out, in 1889, his Letters and Literary Remains, and, in 1895, his Letters to Fanny Kemble, that the world knew much of the man whose work it had long since taken to its heart.

He married, in middle life, Lucy, daughter of Bernard Barton, the Quaker poet, and the interest of his later years was centred in the sea, "knocking about somewhere outside of Lowestoft," as he puts it himself. He was a witty, picturesque, and sympathetic letter-writer, on terms of intimacy with the most interesting men and women of the day. His verse is tranquil and exquisite: the cultured expression of most attractive speculations.

**R. B. Johnson**

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**Fitzgerald**, PERCY HETHERINGTON (b. 1834). Irish writer. Born in co. Louth, he was educated at Stonyhurst, and Trinity College, Dublin.



**Percy Fitzgerald**,  
Irish writer  
*Russell*

Called to the Irish bar, he became crown prosecutor, but abandoned law for literature and removed to London. He contributed stories to Dickens's All the Year Round, and produced many literary studies, historical and theatrical works, and novels. In 1895 he published Memoirs of an Author. He engaged in sculpture as a hobby, and his statue of Dr. Johnson stands in London in the churchyard of S. Clement Danes.

**Fitzherbert**, MARIA ANNE (1756-1837). Wife of George IV. A daughter of Walter Smythe, of Brambridge, Hampshire, she married in 1775 Edward Weld, of Lul-



**Maria Anne Fitzherbert**, wife of  
George IV

After R. Gosway

worth Castle, Dorset. Her second husband was Thomas Fitzherbert, and after his death in 1781 she lived at Richmond. In 1785 she met the prince of Wales, who fell in love with her, but to avoid his attentions she went abroad. He pressed his suit, however, and the pair were married privately on Dec. 21, 1785.

According to the Royal Marriages Act, 1772, the union was illegal, and some, but not the prince, held that it was invalid; the lady being a Roman Catholic, it was sanctioned by the pope. In 1795 George married Caroline of Brunswick and Mrs. Fitzherbert left him for a time. They lived together again until 1803, when the prince began to tire of her. They finally parted, but George seemed to retain some affection for her to the end. Mrs. Fitzherbert, who had an allowance of £6,000 a year, died at Brighton, March 29, 1837. A box of papers was left by her to her executors for use at their discretion, but its contents have never been really examined. See Mrs. Fitzherbert and George IV, W. H. Wilkins, 1905.

**Fitzmaurice, EDMOND GEORGE** FITZMAURICE, 1ST BARON (b. 1846). British politician.



Baron Fitzmaurice,  
British politician

Elliot & Fry

Born June 19, 1846, second son of the 4th marquess of Lansdowne, he was educated at Eton and Trinity College, Cambridge. Entering political life, from 1869-85 he was M.P. for Calne. In 1880 he was commissioner for the reorganization of the European provinces of Turkey and Crete under the treaty of Berlin, and second plenipotentiary at the Danube Conference, London, 1882-83. In 1882 he became under-secretary for foreign affairs in the Liberal ministry, but in 1885 he lost his seat, and until 1898 he remained out of Parliament. He was then returned for the Cricklade division of Wiltshire, retiring in 1905. Again under-secretary for foreign affairs, he was made a peer in 1906, and in 1908-9 was chancellor of the duchy of Lancaster. Lord Fitzmaurice wrote a number of books, the best known being *Life of William, Earl of Shelburne, 1757-77*; and *Life of Earl Granville, 1905*.

**Fitzmaurice-Kelly, JAMES** (1857-1923). British man of letters. Born June 20, 1857, he devoted himself to the study of the language and literature of Spain. He held the posts of Taylorian lecturer at Oxford University, 1902; Norman MacColl



J. Fitzmaurice-Kelly,  
British man of letters

lecturer at Cambridge, 1908 and 1912; and professor (Cervantes chair of Spanish) at King's College, London, resigning in 1920. His works include *Life of Cervantes, 1892*; *A History of Spanish Literature, 1898*; *Lope de Vega and the Spanish Drama, 1902*; *Chapters on Spanish Literature, 1908*; *Miguel de Cervantes Saavedra: a Memoir, 1913*; and an edition of Cervantes' works in English, 1901-3. He died Jan. 11, 1923.

**Fitzpatrick, SIR CHARLES** (b. 1853). Canadian lawyer. Born in Quebec, Dec. 19, 1853, he was educated at St. Anne's College and Laval University there. In 1876 he became a barrister, and in 1879 crown prosecutor for Quebec. From 1890 to 1896 he was a member of the legislative assembly of Quebec,

being one of the representatives of the capital therein. At the general election of 1896 Fitzpatrick entered Dominion politics as member for the same city in the House of Commons at Ottawa. In the same year he was made solicitor-general in the Laurier administration, and in 1902 he became minister of justice. In 1906 he was chosen chief justice of Canada, retaining this post until made lieutenant-governor of the province of Quebec in 1918.

In 1907 he was knighted. From 1908-10 Sir Charles was a member of the Hague tribunal.

**Fitzroy.** River of Queensland, Australia. It is formed by the union of the Dawson with the Mackenzie, and flows an easterly course to discharge into Keppel Bay. It is navigable for steamers up to 1,000 tons to Rockhampton, a distance of 35 m. One of the most important rivers in Queensland, its fertile valley contains many stock farms which supply the refrigerating works on the coast; this industry will develop. There is another river of this name in W. Australia. It rises in King Leopold range, and pursuing a generally westerly course it empties into King Sound on the Indian Ocean. It is navigable for 100 m. Length, 300 m.

**Fitzroy.** North-eastern suburb of Melbourne, Victoria, Australia. It is a manufacturing centre, with a rly. station and several large recreation grounds, including the Edinburgh Gardens to the N.E., the Carlton Gardens to the S.W., and the Fitzroy Gardens to the S. The last are laid out with fine avenues of trees and adorned with statues and fountains. Pop. 34,283. See Melbourne.

**Fitzroy, ROBERT** (1805-65). British sailor. Son of Lord Charles Fitzroy, and grandson of the 3rd duke of Grafton, he was born in Suffolk, July 5, 1805. He entered the R.N. College in 1819, and became lieutenant in 1824. In 1831 he sailed in command of the *Beagle*, a big engaged in surveying the S. coast of S. America, with Charles Darwin as naturalist. During this voyage, 1831-36, Fitzroy surveyed most of the S. American coasts and ran a chronometric line round the world. In 1839 he published his *Narrative of the Surveying Ships H.M.S. Adventure and Beagle*, in three volumes, the last written by Darwin. In 1841 he was



Sir C. Fitzpatrick,  
Canadian lawyer

M.P. for Durham, and in 1843 was appointed governor of New Zealand, but his attitude towards the settlers incurred their anger and he was recalled in 1845. He became vice-admiral in 1863 and died April 30, 1865. He is remembered by his invention of the Fitzroy barometer.

**Fitzroy's Cypress** (*Fitzroya patagonica*). Evergreen tree of the natural order Coniferae. A native of Patagonia, it has slender, spreading branches and flat, overlapping, oval-oblong leaves. The cones are small and star-shaped, consisting of nine scales. The height of the trunk is 100 ft.

**Fitzsimmons, ROBERT** (1862-1917). British pugilist. Born at Helston, Cornwall, June 4, 1862, he went to New Zealand with his parents at the age of nine, and was trained as a blacksmith. After several local successes he entered the ring as a professional, and moved to Sydney, where he beat Bill Slam, West, and Professor Hall, but was himself beaten by Jem Hall in the contest for middleweight championship.

Proceeding to the United States in 1890, he defeated Jack Dempsey—to be distinguished from the later pugilist of the same name—in 13 rounds in the fight for the middleweight championship of the world; nine months later he beat Peter Maher in 12 rounds, and in 1897 obtained the heavyweight championship at Carson City. In June, 1899, he was defeated by Jeffries, and in 1902, although forty years of age, he challenged Jeffries again, but was beaten in the eighth round, after putting up a splendid fight. In 1905 he was beaten in 13 rounds by Jack O'Brien, and after meeting Jack Johnson in 1907, and Bill Lang in 1912, he retired from the ring after an exceptionally long career. He died Oct. 22, 1917.

**Fitzwilliam, EARL** British title held by the family of Fitzwilliam since 1746. The family is an old one, tracing back its descent to Sir William Fitzwilliam of Elmley, Yorkshire. It became specially prominent in the time of Elizabeth. Sir William Fitzwilliam (1526-1599) was the grandson of another Sir William, a London merchant who was also one of the servants of Cardinal Wolsey. The younger Sir William passed much of his time in Ireland as lord deputy, 1571-75 and 1588-94. Having acquired lands in Ireland, his grandson was made an Irish baron in 1620.

William, the 3rd baron (1643-1719), was created a viscount and an earl in 1716, and from him the present peer is descended.

William, the 3rd earl, was made baron (1742) and earl (1746) in the peerage of the United Kingdom. He married Anne, daughter of the marquess of Rockingham, a union that brought Wentworth Woodhouse and large estates to the family. In 1902 William (b. 1872), who as Viscount Milton had been M.P. for Wakefield since 1895, became the 7th earl. The earls own large estates in Yorkshire and Wicklow, also Milton Hall, Peterborough, which has been in the family since about 1500. His eldest son is called Viscount Milton and his chief seat is Wentworth Woodhouse, near Rotherham.

**Fitzwilliam, WILLIAM WENTWORTH FITZWILLIAM, 2ND EARL (1748-1833).** British statesman.

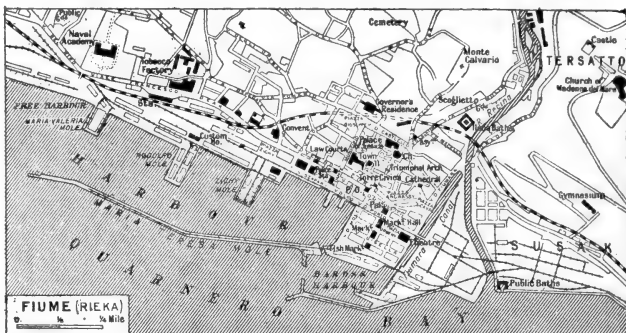


Born May 30, 1748, he was the eldest son of the first earl, whom he succeeded in 1756. In 1782, on the death of his uncle, Lord Rockingham,

*Wentworth Fitzwilliam*  
After W. Owen

ham, he succeeded to the Yorkshire estates of the Wentworths and took the additional name of Wentworth. He was president of the council in 1794, and later in 1806, and was lord-lieutenant of Ireland for a few months in 1795. In 1798 he was appointed lord-lieutenant of the W. Riding of Yorkshire, but was dismissed in 1819 for censuring the Peterloo massacre. Fitzwilliam died Feb. 8, 1833.

**Fitzwilliam Museum.** Art and archaeological museum in Cambridge. It was founded by Richard Fitzwilliam (1745-1816), 7th Viscount Fitzwilliam, an Irish peer, who must be distinguished from Earl Fitzwilliam. He bequeathed to the university his collection of books, illuminated MSS., pictures, drawings, engravings, etc., together with certain dividends, for the erection of a gallery to accommodate them. The money was allowed to accumulate, and when £40,000 had been amassed the Fitzwilliam Museum in Trumpington Street, Cambridge, was begun in 1837 from the designs by George Basevi, continued (1845) by Charles Robert Cockerell, and completed (1874) by Edward Middleton Barry. The schools of art are well represented by over 700 pictures, the original bequest has been increased by other donors, and the museum now possesses in addition a fine collection of antiquities and a valuable library.



Fiume. Plan of the Adriatic port, formerly belonging to Austria-Hungary, and one of the most important seaports of the Adriatic

**Fiume.** Seaport and, since the Treaty of Rapallo (1920), an independent State. It stands on the river Rečina, at its outfall into the Bay of Quarnero, at the N.E. extremity of the Adriatic. It has several harbours—the Fiumara canal, used by coasting vessels; the Baross harbour; the main harbour, which is protected by a mole; and the free and petroleum harbours to the W. Practically all the shipping trade of Hungary passed through its port, and the fisheries are of great importance. Among the features of architectural interest, the cathedral, the Roman triumphal arch, and the governor's residence may be mentioned.

The town possesses distilleries, petroleum refineries, and mills, while there is trade in fruit, barrels, staves, furniture, tobacco, paper, chemicals, fertilisers, and soap. Fiume constituted under the old régime a crown-land of Hungary, with an area of 8 sq. m. The pop. is largely Italian, but the suburb of Sushak across the river, and the

surrounding area, is inhabited by Yugo-Slavs, chiefly Croats. Pop. 49,806.

Fiume's mixed population of Italians, Croats, Magyars, and various other nationalities made it a point of racial dispute. Long a small centre of coastwise trade, it came into prominence only when the Budapest-Zagrab-Fiume Rly. was built. Originally known as S. Vitus in Flumine, in 1465 it became a Hapsburg possession. Charles VI declared it a free port in 1717, and in 1776, by a decree of Maria Theresa, it was handed over to Croatia. In 1807 it was incorporated in Hungary. Two years later, under the rule of Napoleon, it became part of Illyria. In 1822 Fiume was restored to Hungary, but as a result of the Croatian national movement of 1848 was reunited to Croatia. In 1861 it was made autonomous. The Magyars of Fiume under this arrangement favoured the Italian section of its inhabitants, and for nearly fifty years this union strove to prevent Slav predominance. It became in



Fiume. The quays looking north-west from Zichy Mole

appearance a Magyar-Italian city, though the bulk of the shipping was owned and manned by Croats.

Since the Great War its possession has become a burning question. Though not assigned to Italy by the Treaty of London (April, 1915) it was claimed as Italian because it contained a majority of Italian-speaking inhabitants. The Croats, and on their behalf the new Serb-Croat-Slovene government, claimed it as a Southern Slav port as being historically Croatian, further claiming that with the suburb of Sushak it was inhabited by a majority of Southern Slavs.

The feeling between Yugo-Slavia and Italy as to its possession became more strained. The latter maintained it was the most vital port on the Adriatic and was necessary for her. Matters came to a head when on Sept. 11, 1919, Gabriele d'Annunzio, at the head of the Italian volunteers, seized Fiume and set up a national council or provisional government. On Nov. 12, 1920, the Treaty of Rapallo, signed by the representatives of Italy and Yugo-Slavia, established an independent state of Fiume which was to be slightly larger than the independent administrative district formerly incorporated in Hungary; and provided that the new territory should be delimited by a commission. The insurgents in Fiume denounced the treaty, and d'Annunzio declared that Fiume was in a state of war with Italy. The government of the latter expelled the insurgents in Dec., 1920, and in 1923 Fiume was annexed by Italy with the consent of Yugo-Slavia. See Annunzio, Gabriele d'; Italy; Yugo-Slavia; N.V. Consult also Abridged Political History of Rieka (Fiume), F. Sisic, 1919.

**Five Knights' Case.** THE Trial in the court of king's bench, Nov. 22, 1627. Sir Thomas Darnell, with four other knights, Corbet, Earl, Hampden, and Heveningham, had been committed to the Fleet prison the previous March by warrant signed only by the attorney-general for refusing payment of the forced loan raised by King Charles I. They applied for a writ of Habeas Corpus, demanding that the warden of the fleet should bring them before the court of king's bench and specify the cause of their committal.

The case came on for argument Nov. 22, 1627, when the gaoler returned that they were imprisoned by the king's special command, *i.e.* for no stated offence, and the court, presided over by Chief Justice Hyde, decided, Nov. 28, that this was sufficient ground for commit-

tal. The prisoners did not deny the right of the crown to imprison in certain circumstances without showing cause, but pleaded that they were imprisoned for refusing to subscribe to the forced loan, of which they denied the legality. See Forced Loan.

**Five Members.** Specially, the five members of Parliament whom Charles I tried to arrest, Jan. 4, 1642. The relations between the two parties were very strained when the king ordered the attorney-general to prepare articles of impeachment against the five: John Hampden, John Pym, Denzil Holles, Sir Arthur Hazlerigg, and William Strode. This was done, one of the charges being that of levying war against the king, and the House of Lords was asked to order their arrest, a necessary preliminary to their trial before that body. This the peers refused to do, so the king went with the serjeant-at-arms to do it himself; with him were about 300 attendants.

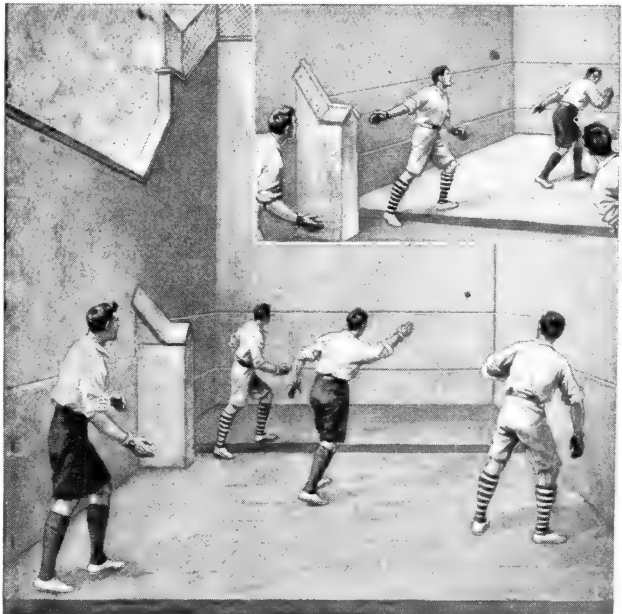
He entered the house just as the warned members had escaped by river to the city, and asked the Speaker for them. The latter, Lenthall, replied that he could only do as the house directed him, to which the king answered, "I see all the birds are flown." Next day Charles went to the city, but again he failed to secure the five. The impeachment was declared illegal.

On the 11th the members returned to Westminster, a great concourse of people, both on the river and on the banks, cheering their arrival.

**Five Mile Act.** Act passed in 1665 which forbade those ministers who had been expelled from their livings in 1662 from residing within five miles of any corporate town or teaching in any school. They could only obtain relief by subscribing to the Act of Uniformity and taking an oath that resistance to the king was unlawful. The Act was part of the Clarendon Code, and became inoperative by lapse of time.

**Five Nations.** Name given to the Indian nation of the Iroquois, because it consisted of five tribes. These were Mohawks, Oneidas, Cayugas, Onondayas, and Senecas. Early in the 18th century they were joined by the Tuscaroras and were known as the Six Nations. (See Iroquois). It is also the name of a volume of poems by Rudyard Kipling, the five nations being the five chief members of the British Empire.

**Fives.** Game of handball. It is played either with the bare hand or with gloves, though at the present time almost invariably with the latter. The derivation of the word fives is doubtful, although various suggestions have been made that it is so called from the five fingers of the hand, or that it was played by five people on each side.



Fives. An Eton game in progress, illustrating the construction of the court. Above, about to volley for the pepper-box

Fives was very popular in the early part of the 19th century, when it was played in closed spaces, especially built for the purpose, and also in tennis courts. One of the most famous of fives courts was in St. Martin's-in-the-Fields, and there is an old print representing Fives in the tennis court in Leicester Fields, which gives some idea of the game as then played. A feature of the game was that the ball was bounced on the ground, and then struck with the hand for the service. This has now entirely disappeared. The ball in the modern games is invariably thrown up by one player and hit by one of the adversaries. William Hazlitt's obituary of John Cavanagh, the Fives Player, which appeared in *The Examiner*, is the best known piece in the literature of the game.

In modern days fives is played chiefly in three forms of court, and is mainly confined to the public schools and universities. One form is Eton Fives. The court, unique in several features, which is now very carefully constructed for this game, originated from part of the chapel at Eton against which the game used to be played. A buttress and some of the chapel steps gave rise to the present hazards in the court which afford so much interest and variety to the game. The court has three walls, and up to a few years ago all courts were uncovered. Now there are a few courts which are covered by a pent-house roof. The game is played by four players, and demands the highest skill and quickness of movement. It is also possible, but not usual, to play a single. The rules of the game for many years existed in oral tradition only, but were eventually codified.

A Rugby fives court, called after the school of that name, is a four-walled building covered with a roof. The walls are all plain, except that on the front wall there is a ledge or board, above which the ball must be struck to be in play. The game is played at the majority of the public schools. The rules were revised and brought up to date in 1913, and are printed in the *Tennis Rackets and Fives Association's Handbook*.

Winchester fives is practically similar to the Rugby game, except that in the left-hand side wall of the court there is a projecting buttress which forms a hazard. Courts of this kind exist only in one or two places outside Winchester. Both the Rugby and Winchester games can be played either by one or two players a side. The service is given by one player throwing the ball on to the wall. His adversary can refuse any

service, but if he does not refuse it, he must hit the ball on to the right-hand side wall, and then on to the front wall above the ledge or line. The rally then proceeds in the ordinary way, i.e. the ball is returned on the volley or the first round above the line. The player who first fails to do this loses the rally, and either yields the service to another player or loses a point. A game consists of 15 points.

The ball used in fives is made like a racket ball. The foundation is of cloth, bound tightly round with twine and covered with white kid. The weight of the ball in Eton fives is  $1\frac{1}{4}$  oz., and in Rugby  $1\frac{1}{2}$  oz.

E. B. Noel

**Bibliography.** Tennis, Lawn Tennis, Rackets and Fives, J. M. Heathcote and others, 4th ed. 1897; Tennis, Rackets and Fives, J. A. Tait, 1890.

**Fivizzano.** Town of Italy, in the prov. of Massa e Carrara. It stands among the Apuan Alps, at an elevation of 1,045 ft., 20 m. N.N.E. of Spezia. It is surrounded by medieval walls, and has castle ruins and other antiquities. In the vicinity are noted quarries of Carrara marble. An earthquake in Sept., 1920, caused widespread havoc. Pop. 17,250.

**Fixture** (Lat. *figere*, to fix). Term used in English law for a thing of a chattel nature which is affixed to the freehold, so as to become part of it, and, therefore, to become realty and not personalty. Sometimes these things can be removed again by the people who put them there, so that they become personal property again, and sometimes not. Practically, questions about fixtures become important as between landlord and tenant, between the heir and the personal representative of a deceased, and between the representative of the owner of a particular estate, e.g. a tenant for life, and the ultimate owner. In the last two cases, the personal representative is entitled to claim only such articles as were put up for domestic use, ornament, or trade use, provided that they are easily removable.

As between landlord and tenant the right of removal is stronger. A tenant is entitled to remove all fixtures put up by him for ornament or convenience which can be removed without much damage to the premises, e.g. marble mantelpieces, pier-glasses, tapestry, grates, etc., or cupboards fixed in the hold-fasts. In the case of trade fixtures, the tenant may remove them, unless in so doing he causes serious damage to the property. Similarly agricultural fixtures can always be removed, but the tenant must make good any damage he does.

A tenant must remove his fixtures before his tenancy expires—he cannot go back afterwards and take them away. If he leaves them behind he has no claim to them, or to compensation for them, as many people suppose; nor can he demand that a succeeding tenant shall pay for them. They are the landlord's property. See Landlord; Tenant.

**Fizeau's Experiment.** Well-known experiment first used by A.H.L. Fizeau for the determination of the velocity of light. The apparatus used consisted of a toothed wheel, which was made to revolve at a definite speed. The teeth of the wheel cut off the view from a distant light when a certain speed was reached, and enabled calculations to be made of the time taken for the light to travel from its source to a mirror and back again. See Light.

**Flaccus.** Name of a well-known Roman family, the following members of which deserve mention: (1) Quintus Fulvius Flaccus, Roman general in the second Punic War. Together with his colleague, Appius Claudius Pulcher, he captured Capua in 212. (2) Marcus Fulvius, one of the commissioners appointed to carry out the agrarian measures of Tiberius Gracchus, who met his death, with Gaius Gracchus, in 121. (3) Marcus Verrius, a grammarian in the reign of Augustus, the author of a work on the Meaning of Words, abridged by Festus (*q.v.*). The poets Horace and Valerius also belonged to the family. See Horace; Valerius.

**Flacius** OR VLACICH, MATTHIAS (1520-75). Lutheran divine. Born at Albona, Illyria, March 3, 1520,

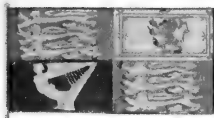


Matthias Flacius,  
Lutheran divine

he studied languages in Venice, and theology at Basel, Augsburg, and Wittenberg, where he came under the influence of Luther and Melancthon, and was appointed professor of Hebrew in 1554. Henceforth he was involved in a series of controversies, siding with Luther against Melancthon. He settled in turn at Magdeburg, Jena, where he was professor of theology, Ratisbon, Antwerp, Strasbourg, and Frankfurt-on-the-Main, where he died in poverty, March 11, 1575.

One of the charges against Flacius was that of Manichaeism, based on his statement that sin was inherent in human nature from the Fall. The work in which this appeared, *Clavis Scripturae Sacrae*





ROYAL STANDARD (UNITED KINGDOM)



UNION JACK



WHITE ENSIGN (BRITISH NAVY)



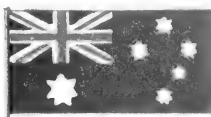
BLUE ENSIGN (NAVAL RESERVE)



RED ENSIGN (BRITISH MERCANTILE MARINE)



CANADA (MERCANTILE MARINE)



AUSTRALIA (ENSIGN)



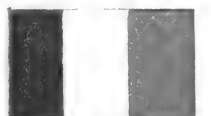
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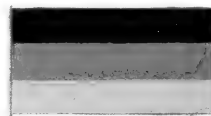
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INDIA (GOVERNOR GENERAL)



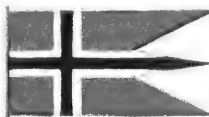
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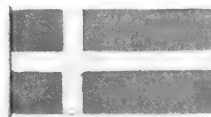
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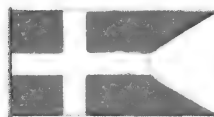
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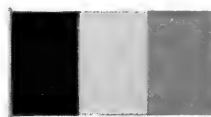
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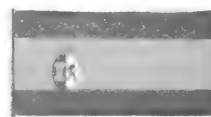
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HOLLAND



BELGIUM



SPAIN



UKRAINE



PORTUGAL



AUSTRIA



HUNGARY



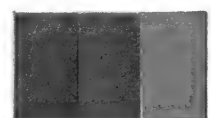
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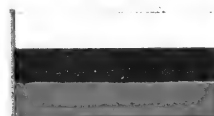
SWITZERLAND



GREECE



ARMENIA



RUSSIA



ALLIES (SHIPPING)



GEORGIA



TURKEY



BULGARIA



RUMANIA



YUGO-SLAVIA



CZECHO-SLOVAKIA

## FLAGS OF THE NATIONS, INCLUDING THOSE ADOPTED AFTER THE GREAT WAR

*Specially drawn for Harmsworth's Universal Encyclopedia by J. P. Campbell*



POLAND



LATVIA



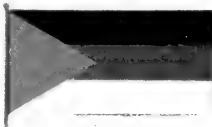
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HEJAZ



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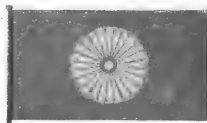
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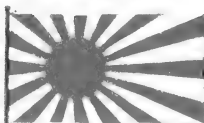
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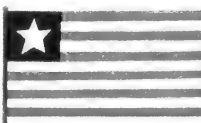
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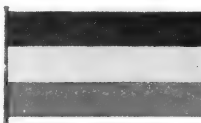
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JAPAN (ENSIGN)



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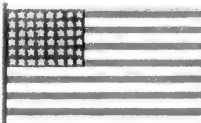
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FEDERATED MALAY STATES



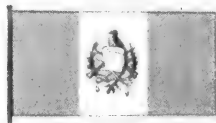
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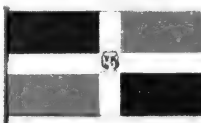
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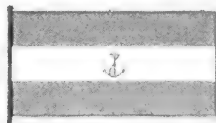
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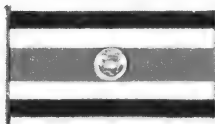
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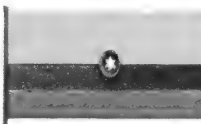
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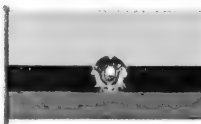
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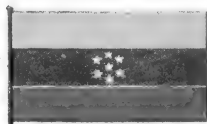
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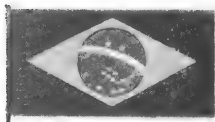
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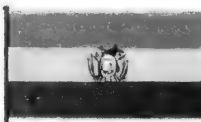
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BRAZIL



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BOLIVIA



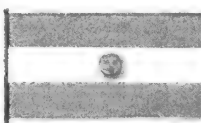
SALVADOR



PARAGUAY



CHILE



ARGENTINA



URUGUAY

# FLAGS OF THE NATIONS, INCLUDING THOSE ADOPTED AFTER THE GREAT WAR

Specialty drawn for Harnsworth's Universal Encyclopedia by J. F. Campbell

(Key to Holy Scripture), 1567, formed the basis of biblical hermeneutics, a term defining the principles of biblical interpretation as distinguished from exegesis or interpretation. Other works of Flacius replied to the Roman objection to the Reformation as a mere innovation, and traced Church history from an evangelical standpoint.

**Flag (Iris).** Large genus of perennial herbs. Of the natural order Iridaceae, they are natives of the N. temperate regions. The species form two groups: one in which the rush-like foliage dies down each autumn, and the life of the plant is continued by a long bulb-like tuber; the other in which the thick, sword-shaped leaves arise from stout, slightly creeping rhizomes. The term flag is generally applied to members of the second group, the others being spoken of by the name Iris. The leaves enfold each other at the base, and from their midst rises the flower stem, bearing the large brightly coloured flowers. There are three sepals and three petals, the sepals much larger than the petals, and the stigmas expanded to look like petals. The yellow flag (*I. pseudacorus*) is common in ditches and marshes. The blue flag (*I. germanica*), so common in gardens, is wild in S. and Central Europe. The seed vessel is a large, leathery capsule, splitting when ripe into three pod-like divisions, packed with large flattened seeds. See Iris.

**Flag.** Pieces of stuff, parti-coloured, or of a single colour, plain or bearing symbols, and flown from a staff or halyard. They may be national or personal. Flags were known to the ancients, though the standard or symbol placed on the top of a staff, like the Roman eagles, were more common. This was followed by the gonfalon type, and then by the guidon, a small piece of stuff attached to a lance. In medieval days the shapes and sizes of flags were diverse, but were soon strictly regulated. The standard was a large and long flag, often with one, two, or more points, parti-coloured and decorated with crests, badges, and devices. The banner was large and square, or rectangular, emblazoned with armorial ensigns, and denoted that the bearer was entitled to levy and lead troops.

The standard with one point was known as the guidehomme (abbreviated into guidon); the ancient was a small guidon; the pennon (bearing badges and motto only) was half the size of the guidon, and had one tail; the pendant was

the ship's guidon; the pennoncelle, or pencil, a small pennon, attached to a lance and usually bearing a single heraldic symbol; the pavon was a triangle, with horizontal base; the banderolle a long narrow flag or streamer, such as the modern pennant.

National flags only evolved slowly. The English white flag with the red cross of S. George appears to have been introduced by Richard I on his return from the East, but it long appeared side by side with many others, including the Royal armorial banner. The British national flag is the Union Jack (*q.v.*). The white ensign, with the red cross of S. George and the Union Jack in the upper quarter, is a naval flag, reserved for the Royal Navy and certain privileged yacht clubs.



Naval Reserve, certain national service ships and privileged yacht clubs. The red ensign, similar to the above in design, is the merchant flag. Regimental flags are similar to the above, the field being of the colour of the regimental facings (see Colours). The British colonial flags are the blue and red ensigns, with Union Jack supplemented by national emblems or armorial shields placed in the fly.

As the result of the Great War, several new national flags came into existence. The flag of Latvia (Lettland or Letonia), one of the new Baltic States, is red, white, red, horizontally, the two red stripes being each double the width of the central white. Estonia has blue, black, and white in horizontal stripes. The present emblem of Austria is similar to that of Latvia, the colours being red, white, red, hori-

zontal, but in this case of equal width. This design only differs from the old flag of Austria-Hungary in not having the lowest stripe half red, half green, the latter colour representative of Hungary. The new flag of Yugoslavia has included the colours of blue, white, red, horizontally. These are the old colours of Serbia and Montenegro rearranged. The kingdom of Hejaz has black, green, and white in horizontal stripes. See Colour Plate.

**Flag Day.** Day set apart for the raising of money for charitable purposes by selling small emblems, usually flags, in the streets. The origin of the scheme was due to the success attending the sale of the artificial roses on Alexandria Day. During the Great War millions of pounds were raised for various war funds by means of flag days. The method was to make millions of little flags, each showing in colour scheme or device the nature of the particular fund. These were sold in the streets by ladies, and were provided with pins so that they could be worn.

In London it was necessary to obtain permission for flag days. Applications were submitted to the commissioner of police. A check on abuses was the stipulation that after the collection, accounts showing the total money received and spent had to be submitted. Statistics compiled from accounts in the metropolitan area between May 13, 1916, and April 9, 1918, showed that a total sum of £286,830 was collected at a cost of £51,432, leaving a net amount of £235,398.

**Flagellants** (Lat. *flagellum*, little whip). Name given to various ascetic bodies in the Roman Catholic Church, that practised flogging themselves or one another as a means of disciplining the flesh and promoting spiritual growth. They arose in Italy in the 13th century, and continued to break out sporadically for about 150 years. One of their chief leaders was Cardinal Peter Damiani, who taught that a vigorous scourging was worth many years of ordinary self-denial and mortification. In 1260 there was a great outbreak of this form of fanaticism at Perugia, and in the following century it caused trouble in Germany and Hungary.

When the Black Death swept over Europe in 1348, the Flagellants had a great revival, and held processions through the streets stripped to the waist and singing penitential psalms. A halt was called at intervals, and all scourged one another in turn. About 120 of these enthusiasts reached London,



Flag. Yellow Flag, *Iris pseudacorus*, showing the tall sword-like leaves; above, flower of *Iris foetidissima*

but they won no followers in England. They were denounced by Pope Clement VI, and finally suppressed by the Inquisition. See Asceticism.

**Flagellata.** Sub-division of the Infusorians, or minute protozoa. Found in stagnant water, they have "whiplike" threads of protoplasm which by their lashing movements propel the animal through the water. The minute Noctiluca, which causes the phosphorescence of the sea, belongs to this order.

**Flageolet** (Fr.). Wind instrument of flute tone, played vertically through a mouth-tube. The modern instrument has a separate mouthpiece,

but those of the 17th century had the blowing hole on a sloped end of the main tube, like the present-day penny whistle. The true 17th century flageolet had two of its six finger-holes at the back, governed by the player's thumbs. See *Flûte-à-Bec*; Recorder.

**Flag Lieutenant.** In the British navy, the personal aide-camp of an admiral. Flag Jack, as the navy calls him, is usually a specialist in signalling. He is distinguished from the other lieutenants by the aiguillette or golden cord on his left breast.

**Flag Officer.** Naval term meaning an officer of admiral's or flag rank. Only admirals hoist flags; other officers, when in command, fly pennants. In the British navy there are four grades of flag officer, viz. rear-admiral, vice-admiral, admiral, and admiral of the fleet, the last being the equivalent of field-marshal in the army. The admiral's flag is derived from the banners which in the old days used to be hoisted aboard ship by generals who held a command at sea. Admirals' flags are: Rear-admiral, S. George's Cross with two red balls; vice-admiral, S. George's Cross with one red ball;

admiral, S. George's Cross; admiral of the fleet, Union Jack. See Admiral.

**Flagship.** Vessel in which a flag officer is accommodated, and in which he flies a distinctive flag to indicate the ship to which others must look for signals. A single fleet may have many flagships, according to the number of its tactical units. The tactical unit is a division of four ships, usually with a rear-admiral in command; and two divisions make a squadron, over which is a vice-admiral, who also has charge of one of the two divisions. A number of battle squadrons, with their attendant craft, make up a fleet, the commander-in-chief, as a rule, flying his flag in a vessel which is outside the divisional formation, and at liberty to place herself where she chooses.

At the principal home naval stations the flag of the local commander-in-chief is flown in an old warship, i.e. the Victory at Portsmouth, the Impregnable at Devonport, the Pembroke at Chatham, and the Crescent at Rosyth, but the officer lives in an official residence ashore. Most of the senior departmental officers in flagships, i.e. those chosen for staff, gunnery, torpedo, navigation, or engineering duties, receive a special flag allowance in addition to their pay. Vessels that are not flagships are sometimes called private ships. See Battleship; Navy.

**Flagstone.** Fine-grained argillaceous sandstone, which splits easily in slabby fashion along the bedding plane. Fine sandstones which do not show this so-called lamination are sometimes included under the same name. Flagstones are composed mainly of minute grains of quartz, but generally contain also some felspathic and micaceous material. The colour of flags varies from almost white to grey or yellow, while the mica flakes, if present, give the stone a sparkling appearance in the sunlight. Their fine, even texture, their strength, and the readiness with which they break into blocks of convenient size make them suitable for use as building stones.

Flagstones are mainly used, however, for paving-stones, kerbstones, hearths, sills, and steps, and those varieties which split into very thin layers are used for roofing.

**Flail** (Lat. *flagellum*, little whip). Hand implement for threshing. It is now little used, except on a small



Flail. The old-fashioned threshing implement in use

scale for flax or when securing peas and beans for seed purposes. It consists of a shaft or handle, commonly made of ash, and a swingle (swipe) of some hard, non-splitting wood. The two are fixed together so that the swingle can move freely, this being effected either by leather thongs or by interlocking an ash swivel on the shaft with a leather loop on the swingle. See Agricultural Implements.

**Flambard**, RANULF OR RALPH (d. 1128). Chief minister of William Rufus. Son of a Norman priest, he was made chaplain to the bishop of London, and after William II's accession became his



Flamborough Head. View from the north, showing part of the lighthouse

Photochrom

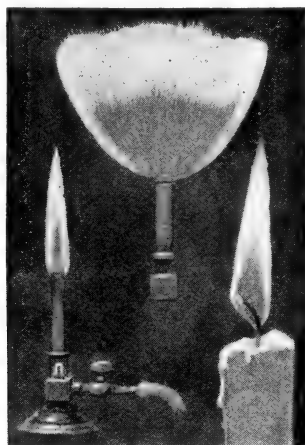
principal adviser, especially in financial matters. In 1099 he was made bishop of Durham. He incurred unpopularity by his extortionate fiscal methods, and after the death of Rufus was imprisoned, but escaped to Normandy, where

he became bishop of Lisieux. He returned to England in 1106, after the battle of Tinchebrai.

**Flamborough Head.** Promontory on the E. coast of Yorkshire, England. It lies to the N. of Bridlington Bay. The limestone rocks, which rise to a height of 450 ft., are pierced by a number of caverns, and the action of the sea has fashioned the rocks into fantastic shapes. The lighthouse is 214 ft. above sea level, and its flashing light is visible for 21 m.

**Flamboyant** (Fr. flaming). In architecture, a development of late French Gothic. It owes its name to the flame-shaped openings in tracery which were its chief characteristic. The period of Flamboyant was the late 15th and early 16th centuries. The style hardly penetrated to Great Britain, though some of the flowing tracery in Chester Cathedral approximates to it. Among French examples are the church of S. Maclou at Rouen, and part of Tours Cathedral. See Architecture.

**Flame.** Gaseous matter raised to a temperature at which it becomes self-luminous, as a result of



Flame. Types of flame. Left to right, Bunsen burner; ordinary burner for lighting purposes; wax candle

combustion. Some gases inflame spontaneously because the ignition temperature is as low as the ordinary temperature of the air. Examples are cacodyl, phosphorus dihydride, and zinc ethyl. As a rule, however, the temperature of the gas must be raised before the chemical reaction with the oxygen of the atmosphere takes place. An agency which lowers the temperature below ignition point puts out the flame; a copper helix placed in a candle flame extracts heat so rapidly that the flame is extinguished.

This cooling action is employed in the Davy miners' safety lamp, where the wire gauze prevents the flame being communicated to the inflammable fire-damp in the mine. It has long been known that ordinary flames are hollow and that there are "solid" flames in cases where the complex molecule of a gas is by combustion broken up into simpler forms, e.g. in burning nitrogen trichloride. Berzelius pointed out that a candle or hydrocarbon flame shows four distinct regions: (1) the dark central region, (2) the yellow region, (3) the blue region, and (4) the faintly luminous portion. The dark portion consists of unburnt gases, whilst the yellow portion occupying the greatest part of the flame is the luminous portion.

The temperature of a flame depends upon the heats of combination of the constituents and the specific heats of the products of the combination. The temperature of sulphur burning in air is comparatively low, whereas an oxy-acetylene flame reaches 2,500° C. The colour of a flame is not as a rule indicative of the calorific power. The yellow gas flame is converted into a hotter non-luminous flame by the admixture of air, such burners, known as Bunsen burners, being used for heating operations in the laboratory and the kitchen.

A sensitive flame is a gas flame produced by a pin-hole burner in which the pressure of the gas has been increased till it is on the point of flaring. This long, thin flame is a very sensitive detector of sound waves, particularly of those of high pitch and tiny amplitude. When a train of these sound waves impinges on the sensitive flame it flares and suddenly shortens. See Fire; Heat.

**Flame-flower** OR REDHOT POKER (*Kniphofia aloides*). Perennial herb of the natural order Liliaceae.

It is a native of S. Africa. The leaves, which grow in a compact tuft from the root, are long, narrow, and of tough consistence; they are channelled above and keeled below, the keel and the edges finely toothed. The brilliant red, tubular flowers are disposed in a close oval

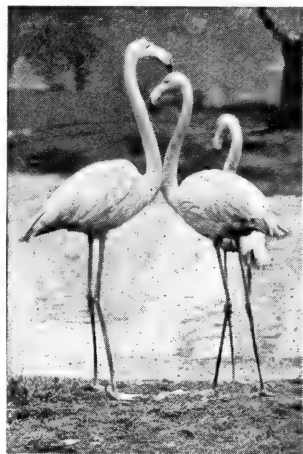


Flame-flower. Specimens in bloom

spike, at the summit of a stem 3 ft. or 4 ft. high. The aspect of the flowers gives the herb its descriptive name.

**Flamen.** In ancient Rome, a priest devoted to the service of a particular god. The chief of these priests, who had to belong to the patrician order, was the flamen Dialis or priest of Jupiter. Not only the flamen Dialis himself, but his wife, who was called Flaminica, and the whole household were regarded as consecrated to the god.

**Flamingo** (*Phoenicopterus*). Order of large birds, nearly related to the ducks. They have extremely



Flamingo. Adult specimens of the European flamingo

long legs and necks, rosy or scarlet plumage with black on the wings, and beaks sharply bent down at an angle. Adult specimens sometimes exceed 6 ft. in height. One European species, four or five American, and one African are known.

Flamingoes are wading birds, as their long legs and necks suggest, and are found in great flocks by the margin of lakes and rivers, feeding on molluscs and aquatic vegetation. When feeding, the flamingo's head is turned upside down and the curved beak acts as a scoop for picking up food. The birds are fairly strong in flight, and can swim well. The nests are made of mud, and when built on land rather resemble large soup plates. When constructed in the water, they are tall and conical. The European flamingo is common in the S. of France and in Spain during the nesting season, and it ranges through many parts of Africa. It is very rarely met with in Great Britain. The French name is *flamant*, Span. *flamenco*, ultimately from Lat. *flamma*, flame, in reference to the bird's colour.



**Flaminian Way** (*Via Flaminia*). Ancient Roman road. It took its name from C. Flaminius, censor in 220 B.C., who extended it to Ariminum, making it the first Roman road to cross Italy. Previous to this time it had existed only as far as Spoletium. It issued from Rome at the Porta Flaminia, being a continuation of the Via Latina, and, crossing the Tiber by the Milvian bridge, reached Spoletium by way of Narnia.

**Flamininus, TITUS QUINTIUS** (d. c. 175 B.C.). Roman general. Before he was 30, he attained the consulship, and in 197 defeated the Macedonians at Cynoscephalae (*q.v.*). A clever diplomatist and an admirer of the Greeks and their culture, he was appointed to settle the affairs of that country. At the Isthmian games in 196 he proclaimed amidst great enthusiasm the independence of Greece, really the exchange of a Roman for a Macedonian master. After crushing the Spartan tyrant Nabis, he was honoured by a splendid triumph on his return to Rome in 194. In 192 he was again in Greece and prevented the pro-Syrian party from assisting Antiochus in his struggle against Rome. In 183 Flamininus was sent to demand the surrender of Hannibal from Prusias, king of Bithynia.

**Flaminius, GAIVS.** Roman statesman. He introduced an agrarian law in 232 B.C., providing for the distribution of recently conquered territory in Picenum and Senonian Gaul among the plebeians. During his censorship in 220 he built the great Circus Flaminius, and constructed the Via Flaminia. He was one of the generals in command of the Roman army at the battle of the Trasimene lake in 217, in which he himself was slain.

**Flammarion, CAMILLE** (1842-1925). French astronomer. B. Feb. 26, 1842, at Montigny-le-Roi, he studied theology at Langres and Paris. In 1858 he entered the Paris observatory, and was a member of the Bureau des Longitudes in 1862. From 1863 onwards he edited *Cosmos* and *L'Astronomie*. He carried out numerous observations, especially on Mars, at his private observatory at Juvisy. He won wide fame as a popular writer on astronomy, and founded the astronomical society of France in 1887. In Oct., 1920,

he married Gabrielle Renaudot, his collaborator in some of his chief works. Among his books translated into English are: *Popular Astronomy*; *Astronomy for Amateurs*. He died June 4, 1925.

**Flammenwerfer** (Ger., flame-thrower). Special type of blow-lamp for military use. German equipment of this type was designed as a method of cutting barbed-wire entanglements by melting the strands, but during their attack at Hooze in 1916 was employed by them against the defenders, and was subsequently used on many occasions as a short range weapon in trench fighting. Similar devices were later adopted by the Allies.



Flammenwerfer. French soldier testing a captured German flame-thrower of the portable type

The *Flammenwerfer* consists essentially of a reservoir of inflammable oil, usually petroleum or benzene, which can be thrown to a considerable distance in the form of a spray, by means of a suitable nozzle, the oil being forced through the nozzle by the pressure of gas contained in a separate reservoir. The end of the nozzle is fitted with mechanism for igniting the spray. The *grosser* (large) *Flammenwerfer* held nearly 350 pints of oil.

The *kleiner* (small) *Flammenwerfer* was portable, and held about 16 pints of oil in a reservoir with attached gas reservoir, so designed as to carry from the operator's shoulders a short length of hose carrying a nozzle. See Trench Warfare.

**Flamsteed, JOHN** (1646-1719). English astronomer. Born at Denby, Derbyshire, Aug. 19, 1646, he was educated at Cambridge, and devoted himself early to the

study of astronomy. He was appointed King's Astronomer in 1675, with an annual salary of £100, and installed eventually at the New Greenwich Observatory, begun in that year. His observations there gave Newton much help in the perfecting of his lunar theory,



*John Flamsteed* though there was much ill-feeling between the two men. Flamsteed's chief work was the great catalogue of the fixed stars, the origin of all later catalogues, which was incomplete at his death on Dec. 31, 1719, but was published with his other observations in 1725. See *An Account of the Rev. John Flamsteed, the first Astronomer Royal*. To which is added his *British Catalogue of Stars*, F. Baily, 1835.

**Flanches** or **FLANQUES**. In heraldry, the dexter and sinister sides of a shield cut off by curved lines, giving the middle an hour-glass form. They are usually borne in pairs. Classified among the Sub-Ordinaries (*q.v.*)



Flanches, in heraldry

**Flanders.** Name given to that part of the Netherlands which is bounded roughly by the lower reaches of the river Schelde, the Lys valley, and the coast from Calais to the Schelde estuary. The political frontiers of Flanders have varied considerably, but most of this territory now lies in Belgium, and the old name is retained in the two provinces of W. Flanders (Flandre Occidentale), and E. Flanders (Flandre Orientale). These provs. are markedly different in character from the Walloon provs. of Belgium, being mainly peopled by peasant Flemish stock, almost entirely speaking their own Flemish tongue, a Teutonic language closely akin to Dutch. Ethnologically, a large part of the French dept. of Nord is Flemish, and is often referred to as French Flanders. The chief towns of W. Flanders are Bruges, Courtrai, Ostend, Roulers, Thielt, Furnes, Ypres, Dixmude; of E. Flanders, Ghent, Alost, Audenarde, Eecloo, St. Nicolas Termonde. W. Flanders, area 1,249 sq. m., pop. 884,777; E. Flanders, area 1,158 sq. m., pop. 1,134,079.

The original inhabitants of Flanders were known to the

Romans as the Menapii and the Morini, whom they conquered about 51 B.C. During the 7th century Christianity was introduced, chiefly by S. Bertinus, S. Omer, and S. Bavon. The treaty of Verdun, 843, by which the empire of Charlemagne was partitioned among his sons, gave the greater part of Flanders to Charles the Bald of the W. Franks. Finding this part of his dominion constantly harassed by the Northmen or Normans, he entrusted its defence to Baldwin Bras-de-Fer (Iron-Arm), who founded the historic line of the counts of Flanders. The last of the direct line, Baldwin VII, died in 1119, and Flanders passed to his cousin Charles, called the Good.

#### Flanders and Hainault

In 1157 Count Thierry resigned in favour of his son Philip, who ruled with marked success, being largely responsible for the early economic prosperity of the great Flemish market towns of Bruges, Ypres, Ghent, etc., and who died crusading at Acre, 1191. He left his Flemish dominions to his sister Margaret of Hainault, who thus united the crowns of Flanders and Hainault, though ceding Artois to Philip Augustus of France. Her son, Baldwin IX (1171-1205), emperor of Byzantium, succeeded her in 1194. His daughter, Joanna, was married to Ferdinand of Portugal, who resisted the suzerainty of France, but was disastrously defeated at Bouvines, 1214.

After Joanna's death, 1244, the kingdoms of Flanders and Hainault were torn by a war of succession, and were eventually separated by the arbitration of S. Louis, who awarded Flanders to William of Dampierre, and Hainault to his stepson, John of Avesnes, 1246. Guy of Dampierre, who succeeded in 1280, waged war, in alliance with Edward I of England, against Philip the Fair of France. Supported by popular feeling, directed by the Flemish patriots, Deconinck and Breydel, he routed the strong force of French knights near Courtrai, 1302, and for a time Flanders was definitely free from France. But under Louis of Nevers, 1322-46, it was again virtually a French fief.

The following period of internal dissensions was marked chiefly by the resistance of the Flemish communes to the arbitrary and extortionate rule of Louis II of Male, who succeeded in 1346. The names of John and Philip van Artevelde (*q.v.*) hold a great place in Flemish history as spokesmen and leaders of the popular party, or White Hoods. By the autumn of 1382 Philip had become very powerful in W. Flanders, established in

Bruges, and assured of the people's support. But at Roosebeke, Nov. 27, 1382, he was utterly defeated by Louis with the aid of Charles VI of France. Thenceforth Louis ruled with a firm hand until his death, 1385, when Flanders fell to his daughter Margaret, wife of Philip the Bold of Burgundy.

From this date Flanders was for historical purposes part of Burgundy, until, in 1477, Mary of Burgundy married the emperor Maximilian and brought it into the empire. It was in this period that the extraordinary economic prosperity of the great Flemish towns reached its highest point. The abdication of Charles V brought Flanders into the Spanish dominions under Philip II in 1555, introducing the long wars for the independence of the Netherlands, and the old-time prosperity suffered sadly. In 1648 the treaty of Westphalia made Flanders part of the United Netherlands, and in 1659 and 1713 Louis XIV absorbed large parts of Flemish territory as well as Artois. In 1714 the treaty of Rastatt put Flanders again into Austrian possession, and in 1794 it fell into French hands once more. But when the new kingdom of Belgium was formed in 1830,

Flanders entered into her present position therein.

#### Modern Flanders

Neither these many changes of sovereignty, nor the unfortunate position of Flanders as a battlefield of the nations, has destroyed the individual character of the Flemings or their country. Within Belgium itself racial consciousness is sharply marked. The possession of a tongue and literature of their own has given the Flemish national movement considerable strength. It has won recognition of Flemish rights, linguistic and educational, and is to-day an important factor in Belgian politics. A strong body of feeling has long favoured Flemish autonomy, and during the Great War the Germans tried unsuccessfully to exploit this against Belgian unity by establishing the so-called Council of Flanders at Ghent, 1917. But despite the discredit done to the cause by a few extremists, the movement is growing in strength, and may well modify still further the Belgian constitution. *See* Belgium; consult also *Histoire de Belgique*, H. Pirenne, 1900, etc.; *Belgium*, R. C. K. Ensor, 1915; *The Language Question in Belgium*, A. van de Perre, 1919. J. E. Miles

## FLANDERS: THE BATTLE OF 1918

H. W. Wilson, *Military Critic of The Daily Mail*

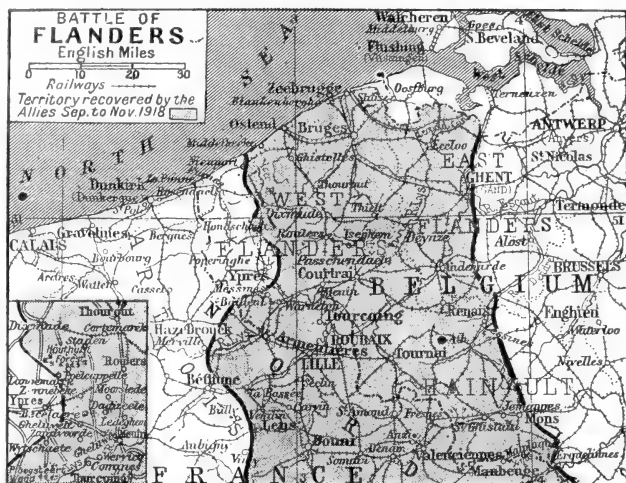
*This engagement was one of those that finally broke the German resistance. For the other battles of these closing months of the Great War see Cambrai; Le Cateau; Sambre; Selle. See also Foch; Haig; Great War*

This battle was fought in Sept.-Nov., 1918. The heavy fighting in Flanders in 1914, sometimes known as the 1st battle of Flanders, is more usually described under the titles Ypres and the Yser.

In accordance with Foch's general plan, which was, after recovering the initiative from the Germans in the 3rd battle of the Marne (July 18-Aug. 3, 1918), to press them continually by attacks which should gradually develop along the whole Allied front in the W., preparations were made in Sept., 1918, for a great Allied offensive extending from Dixmude to the S. of the Ypres salient. For that purpose a group of armies was formed and placed under the king of the Belgians. It consisted of the Belgian army, with three divisions on the Allied left, the 6th French army (Boissoudy), with three divisions in line and one in reserve, which were to engage in the centre, and the 2nd British army (Plumer), with the 2nd and 19th British corps, on the right. Gen. Degoutte, one of the French officers who had particularly distinguished himself in the 2nd and

3rd battles of the Marne, acted as King Albert's chief of staff. The German force on the front selected for attack was only 5 divisions strong, and formed part of the 4th army under Sixt von Armin. The date fixed was Sept. 28, coincident with the tremendous assaults which were being delivered by the British armies on the Hindenburg line, and by the French and American armies.

At 5.30 a.m. of the 28th, without any preliminary bombardment, the Allied infantry suddenly advanced, covered by a creeping barrage, and employing all the latest tactical methods, including the "leap-frogging" of fresh divisions through the assaulting troops as these tired. The hideous terrain S.E. of Ypres was crossed at a single bound. Wytshaete, lost in April, 1918, Zandvoorde, Gheluvelt, and Becelaere were stormed by the British. The French and Belgians took Zonnebeke, Poelcappelle, and Houthulst Forest. The country was almost impassable; rain fell heavily and hampered the assailants, but the Germans at the outset offered only a feeble resistance.



Flanders. Map of East and West Flanders indicating the area recovered from the Germans during the great battles of Sept.-Nov., 1918

On Sept. 29 the attack was continued with the utmost determination. That day the Belgians took Dixmude and Passchendaele, and reached the high road from Roulers to Menin, while the British cleared Ploegsteert Wood, recovered Messines, and reached Warneton and Dadizele. On Oct. 1 the British were close up to Wervicq, and had crossed the Menin-Roulers road near Ledeghem, while the Belgians and French had cleared Moorslede and Staden. It was then necessary to suspend the advance in order to bring up the heavy artillery and repair the roads. The German front had been penetrated to a depth of over 8 m., and all the German main defensive lines on the Flanders front had fallen. The capture of 10,000 prisoners and 200 guns, half of them taken by the British 2nd army, afforded practical proof of the importance of the victory. The Germans at once began preparations for the evacuation of the Flanders coast, which had so long been a menace to London as the base of their cruel air attacks, and which they had at one time decided to annex permanently.

Between Oct. 1 and 14 another British corps, the 10th, was brought up and the Allied communications were reorganized. The Germans had utilised the respite to lay wire, construct machine-gun positions, and bring up what reserves they possessed. At 5.35 a.m. of Oct. 14 the second phase of the battle opened along the whole front from Comines to Dixmude. The Belgians reached the outskirts of Iseghem, and the French

enveloped Roulers. The British carried Gheluwe, and fought their way into the outskirts of Menin. On the next two days further important gains were made. Thourout and Cortemarck were captured, and the British at several points secured bridge-heads over the Lys. The sound of heavy explosions in the German lines and along the Flanders coast told that von Armin was destroying his dumps and blowing up his heavy guns.

The Belgians directed their advance northwards to clear the Germans out of the coast, and, if possible, to get on the line of their retreat; but von Armin was too quick. On Oct. 17 the last Germans quitted Ostend, almost exactly four years from the date on which they had entered it, and that same day the British entered Courtrai. On Oct. 18 the Belgian advance compelled the Germans to abandon Zeebrugge, and this naval base, with the city of Bruges, was occupied by the Allies on Oct. 19. To the S. the Germans were also compelled to retreat to avoid envelopment, and on Oct. 18 they had abandoned the industrial centres of Tourcoing and Roubaix. On the 20th the Belgians reached the Dutch frontier.

The Germans were now in slow retreat along this whole section of the front; they were steadily pressed, and, by the date of the armistice (Nov. 11), the Allies had reached a line which ran from the Dutch frontier south of Terneuzen to Ghent, and thence along the Schelde past Ath, to a point near St. Ghislain where they linked up with Haig's main group of British armies. In the second battle of Flanders the British captured 6,000

prisoners and 210 guns, and the French and Belgian captures were about as large. The trials of the Allied troops were severe; they had to march and fight in most difficult country with deplorable communications which rendered the supply of food and ammunition exceedingly difficult. Mines with delay-action fuses were left by the Germans at all cross-roads, and at many points on the railways, as they retreated, and these exploded, sometimes weeks after their retirement. Foch, who visited the 5th British army (Birdwood), which took part in the Allied advance on the front south of the 2nd army, gave the British troops just praise for the magnificent character of their work. "Your soldiers," he said, "marched when they were exhausted, and they fought, and fought admirably, when they were worn out. It is with such indomitable will that the war has been won."

**Flandin**, EUGÈNE NAPOLÉON (1809-76). French painter. Born in Naples, Aug. 15, 1809, he studied in Italy, and under Horace Vernet in Paris, and travelled widely in the East. He painted many landscapes, notably of Venice, Athens, Algiers, and Constantinople, and wrote valuable accounts of his travels and archaeological discoveries. He was awarded the Legion of Honour in 1842, and died Feb. 15, 1876.

**Flandrin**, JEAN HIPPOLYTE (1809-64). French painter. Born at Lyons, March 23, 1809, son of a miniature painter, he studied there, and at Paris under Ingres (*q.v.*). Obtaining the Grand Prix in 1832, he went to Rome, whence he returned in 1838 to Paris, and was employed in the mural decoration of S. Séverin, 1841, S. Vincent-de-Paul, 1850, and other churches at Paris and elsewhere. Later he took to portrait-painting, among his best works in this genre being the full-length portrait of Napoleon III, at Versailles. He died of smallpox at Rome, March 21, 1864.

**Flandrin**, JEAN PAUL (1811-1902). French painter. A brother of J. H. Flandrin, he was born at Lyons, May 8, 1811, and studied under Ingres. He was a prolific artist, his best work being of landscapes. Among the most noteworthy are his *Solitude* in the Sabine Mountains, 1852, in the Luxembourg, Paris; *The Rhône*, 1857; *Meadow near Mantua*, 1874; and *Diggers at Work*, 1884. He was awarded the Legion of Honour in 1856, and died in 1902. His eldest brother Auguste (1804-43) worked under Ingres, and was a teacher of painting at Lyons.

**Flange** (Fr. *flanc*, flank, side). Projection which guides, strengthens, or affords a means of attachment. Circumferential flanges are used on wheels which run on rails or over which rails, belts or ropes run, to prevent displacement. In metal beams or girders the central part, or web, has a flange at one edge or, more usually, at both edges, to give lateral stiffness and take the bending stresses of tension and compression. Annular or oval flanges are used on the ends of steam and other pipes which are subject to heavy pressures, so that the pipes may be drawn and held together by bolts. The hubs of wire-spoked wheels have flanges to which the heads of the spokes are secured. See Girder.

**Flank.** Military term used for the side of a unit, whether in column, line, mass or any other formation. On the march troops are protected by flank guards, and, when taking up a position, by outposts, unless the nature of the ground makes an attack impossible. See Tactics.

**Flank Guard.** Patrols or bodies of troops detailed to protect the main body from flank attacks while on the move or at rest. The strength of the flank guard and its distance from the main body depends on the size of the latter and the nature of the country. It should always be strong enough to hold up any attack until the main body has had time to deploy into fighting formation, if the attack is too strong to be defeated by the flank guard. A large flank guard must protect itself by advanced and flank guards so that it can move in close formation.

**Flannan Isles.** Cluster of seven small islands in the Outer Hebrides, Ross and Cromarty, Scotland. Called also the Seven Hunters, they lie 16 m. N.W. of Gallon Head, Lewis Island, and contain many Caledonian remains. They are the *Insulae Sacrae* of Buchanan. Large numbers of sea-fowl frequent them.

**Flannel.** Soft woollen cloth used for clothing, blankets, etc. Highly absorbent, it is eminently adapted for wearing next the skin. The word is probably of Celtic origin (cf. Welsh *gwan*, wool). Wales is the original home of the flannel industry, and has long held flannel fairs. Falstaff calls Sir Hugh Evans the "Welsh flannel." Welshpool, in Montgomeryshire, formerly the chief seat of the manufacture, has been superseded by Newtown. Lancashire and Yorkshire are noted for flannels, particularly the town of Rochdale. See Blanket.

**Flannelette.** Cotton imitation of flannel, used for pyjamas, underwear, etc. The term was first used towards the end of the 19th century. Flannelette is now made extensively in Europe and the U.S.A., and is a popular clothing material, though it lacks the absorbent properties of flannel, and is liable to catch fire. A "non-flam" flannelette has been patented.

**Flare.** Fireworks of the nature of coloured fires. They are used in warfare to illuminate portions of the front at night, and in some cases are arranged so that they are automatically ignited if anyone moving about stumbles over a trip wire placed in front of the position. Screens should be arranged behind the flares so that the enemy troops are illuminated, while their opponents remain in the shadow and are not inconvenienced by the light. Small hand flares are used for both illumination and signal purposes, and generally burn for about three minutes. Larger ones may be thrown from trench howitzers. Flares intended to illuminate the ground usually contain a mixture of powdered magnesium and a chlorate or nitrate of one of the alkali metals. They give an intense white light, throwing strong shadows. Similar flares were also employed on board ship to illuminate particular operations, as at Zeebrugge and Ostend. Signal flares are frequently required to give a coloured light, and for this purpose the following compositions are typical:

	Red	Green	Blue	Yellow
Potassium chlorate ..	78	—	45	—
Strontium carbonate..	15	—	—	—
Shellac ..	7	1	5	—
Barium chlorate ..	—	66	—	—
Milk sugar ..	—	33	—	—
Sodium nitrate ..	—	—	—	70
Sulphur ..	—	—	—	20
Antimony sulphide ..	—	—	—	7
Lampblack ..	—	—	5	3
Basic copper carbonate..	—	—	10	—
Calomel ..	—	—	35	—

See Fireworks.

**Flash.** Bow of broad black silk ribbon with long ends, which is attached to the back of the tunic collar of the Royal Welch Fusiliers. No authentic explanation of this custom is forthcoming, but in



Flash. Distinctive bow worn by the Royal Welch Fusiliers

an inspection report of 1786 it was noted that "the officers of this regiment wear the hair turned up behind." Evidently the flash is a survival from the days of queues and hair powder; it is issued officially as an item of "personal clothing." See Uniform.

**Flashlight Photography.** Photography by the brilliant light obtained by burning the metal magnesium. It is used chiefly for portraits, groups, and interiors of moderate size. In one apparatus fine magnesium is blown through the flame of a spirit lamp, but the magnesium is usually combined with chlorate or perchlorate of potash, and fires readily on the application of a taper or electric spark. The chief drawback to these "flash-powders" is the smoke which is produced by them. See Photography.

**Flash Point.** Temperature at which an inflammable liquid gives off vapour which takes fire when a flame is passed over the surface. It is also used for that at which the vapour that collects forms an inflammable mixture with the air in the closed vessel of the test apparatus. The former is called the open and the latter the closed test. The test is specially applied to petroleum products. The open test was employed in accordance with Petroleum Acts, 1868 and 1871.

In consequence of the unsatisfactory results, Sir Frederick Abel investigated the matter, with the result that the Petroleum Act, 1879, was passed, legalising the closed or Abel test. The new standard was fixed at 73° F. (22.8° C.). The Abel apparatus, which is standardised by the board of trade before use, is employed in this country for low-flash oils, and by order in Council, 1907, the Abel-Pensky apparatus for high-flash oils. For determining the flashing point of the heavier mineral oils modifications of the above apparatus are used. These are the Pensky-Martens and Gray apparatus. See Oil; Paraffin; Petroleum.

**Flask.** Word used in various senses. (1) In founding, a wooden or iron box or frame-like structure for holding the sand or material forming a mould into which molten metal is poured for making a casting in a foundry. The flask comprises a cope, or top member; a drag, or bottom member; and, when used, intermediate members termed cheeks. If the mould is contained in two or more members, the structure is known as a two-part flask, a three-part flask, etc. (2) A vessel of glass, metal, etc., usually having a neck, and provided with a body portion which

may assume a variety of shapes, for use in storing and heating liquids, and, formerly, as a receptacle for gunpowder. (3) As applied to ordnance, a flask is a metal reservoir for storing compressed air which forms the actuating medium of a motor for an automobile torpedo.

**Flat.** Self-contained residence. It is on one floor, with a private entrance door, and opening on to a common staircase. Many buildings are composed of such separate dwellings. The upper stories of business premises are frequently used as flats, and sometimes ordinary dwelling-houses are so adapted. In Scotland a block of flats is known as a flatted house, and in the U.S.A. as an apartment house. *See* Housing.

**Flat.** In music, a sign (♭). It indicates that the note to which it refers is to be a semitone lower in pitch than the ordinary note of the same alphabetical name or in the same position on the staff. It was first applied to the note B, and the sign was actually a little *b*, to distinguish this note from  $\sharp B$  which in Germany was and is still called H ( $\sharp = h$ ). *See* Double Flat; Natural; Semitone; Sharp.

**Flatbush.** Suburb of Brooklyn, U.S.A. Formerly a township in King's co., Long Island, it was acquired by Brooklyn in 1894, and became a part of that borough four years later. The battle of Long Island, Aug. 27, 1776, is sometimes called the battle of Flatbush.

**Flateyjarbok.** Icelandic manuscript dating from the 14th century. Among other things it contains some account of the voyages of the Norsemen of the 10th and 11th centuries to the American continent. Flateyjarbok (the Book of Flatey) is preserved at Copenhagen. *See* Anecdotes of Olave the Black, J. Johnstone, 1780; Flateyjarbok, ed. G. Vigfusson and C. R. Unger, 1860-68.

**Flatfish** (*Pleuronectidae*). Large group of fishes of flattened shape, in which the two sides are unlike in colour and the two eyes are on one side. The plaice and sole are examples. In these fish the body is greatly compressed laterally. In early life the flatfish are symmetrical, and swim like round fishes. Then they become flattened, the body tilts over, and the fish takes to swimming on its side and to lying on the bottom of the sea. The upper side then becomes darkened, and assumes a hue which approximates to the nature of the ocean bed on which it lies, while the markings closely

resemble the gravel and motings of the sand or mud. At the same time, the eye on the under side gradually works round to the upper surface and the mouth becomes more or less twisted.

Flatfish are marine in habit, though flounders frequently ascend rivers, and a few species have adapted themselves to a life in fresh water. Most are good table fish.

**Flat Foot.** In mankind, a condition in which the arch of the foot is reduced, or in bad cases nearly abolished, so that almost the whole extent of the sole comes in contact with the ground. Flat foot is most common in young persons of poor physique, whose occupation has necessitated their



**Flat Foot.** Illustration of a severe case. Above, diagram of the foot with corrective apparatus supporting the arch

standing for long periods, or frequently carrying heavy weights. Occasionally it may result from injuries to the foot which have torn or weakened some of the ligaments.

Flat foot produces feelings of fatigue and weakness after a comparatively small amount of exercise. Severe pain may be felt in the sole, and the gait becomes shuffling and awkward. Eventually, the whole posture of the body may be altered, particularly when the condition is more marked in one foot than in the other. Compensatory changes may result in a tilting of the pelvis, curvature of the spine, and even changes in the position of the shoulders.

In early cases, where weakness rather than actual deformity of the arch is present, rest should be

enjoined; at the same time, the patient should undergo a course of instruction in exercises specially designed to strengthen the weak parts. When the condition is more marked, it is necessary to afford artificial support to the arch of the foot by means of instep-pads worn inside the boots. These, however, merely relieve the symptoms, and exercise no curative functions. In long-standing cases, remedial measures may prove useless, and a surgical operation alone will relieve the condition. *See* Foot.

**Flatman**, THOMAS (1637-88). English miniaturist. He was born in London, and educated at Winchester and New College, Oxford, of which he was scholar and fellow. He became a barrister and practised poetry and miniature painting as an amateur, the latter with conspicuous success. Walpole cites a portrait of Dr. Tooke's father by him which was highly praised by contemporary connoisseurs. He died Dec. 8, 1688.

**Flattening Out.** In aeronautics, a manoeuvre whereby an aeroplane in making a descent decreases its gliding angle until its flight path becomes almost horizontal. It also means to raise the nose of a flying-machine after a steep dive, and thus bring it back to its normal line of flight.

**Flattery.** Cape or promontory of Washington, U.S.A. At the S. side of the entrance to the strait of Juan de Fuca, it is the extreme N.W. point of the state. There is another cape of this name in Queensland, Australia, in Banks co., about lat. 14° 52' S.

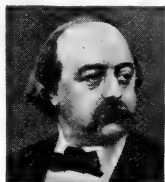
**Flatulence** (late Lat. *flatulentus*, full of wind). Gas in the stomach or intestines. It is due partly to air which is swallowed with food, and partly to the fermentation of food in the alimentary canal. The condition is often associated with disorders of digestion, and results from too hasty swallowing of food or imperfect mastication. Hysterical persons are more prone to develop the condition. Intestinal flatulence is often associated with constipation.

The treatment consists in attention to the teeth, thorough mastication and avoidance of starchy food and sugar. Intestinal flatulence necessitates proper attention to the bowels. Dyspeptic conditions should receive appropriate treatment. *See* Dyspepsia.

**Flaubert**, GUSTAVE (1821-80). French novelist. Born at Rouen, Dec. 12, 1821, the son of a surgeon, he went to Paris to study law in 1840, but spent a number of years in travel, visiting the East in



1849-50. Returning to Paris in 1850, he began his first novel, *Madame Bovary*. It took six years



*G. Flaubert*

of constant labour to complete, and was published serially in 1857. An action against author and publisher for its alleged immorality was dismissed, and the book, his undoubted masterpiece, made

his name famous. There followed *Salammbô* (Eng. trans. M. F. Sheldon), 1862; *L'Éducation Sentimentale*, 1869; *La Tentation de S. Antoine* (Eng. trans. R. Francis), 1874; *Trois Contes*, 1877; and the posthumous *Bouvard et Pécuchet*, 1881. Flaubert died at Croisset, near Rouen, May 8, 1880.

He was the dominant figure among French novelists of the last epoch of Romanticism. A literary descendant of Balzac, he was by turns a sheer realist and a sheer romanticist, in both aspects brilliant and infinitely laborious. He took his art very seriously, tormenting himself for days in the search for a word, polishing his work with untiring zeal. His technical skill, especially as a realist, greatly influenced later French writers, in particular the De Goncourts and Zola. See *Flaubert's Correspondence* with George Sand, preface by Guy de Maupassant, 1884; *Life*, É. Faguet, 1899.

**Flauto traverso** (Ital., cross flute). Ordinary present-day flute. It is played crosswise, with a side blowing-hole; formerly it was called the German flute. See *Flute*.

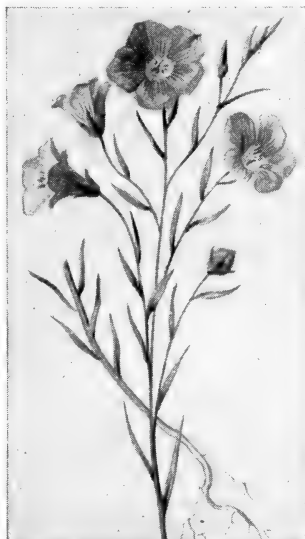
**Flaveria contrayerba**. Biennial herb of the natural order Compositae. A native of Peru, it has opposite, saw-toothed, lance-shaped leaves, and yellow flower heads. In Chile a yellow dye is obtained from the plant.

**Flavine** (Lat. *flavus*, yellow). Antiseptic, the value of which was discovered in 1916 by the Bland-Sutton Institute for Clinical Pathology of the Middlesex Hospital, London. The discovery of the drug itself was due to Prof. Ehrlich, who treated cases of sleeping sickness with it. Flavine is a yellow dye belonging to the acridine series, hence its official name acriflavine. Unlike most germicides, it is absolutely harmless to the tissues. The discovery of its efficacy as an antiseptic was hastened by the

need for such a drug occasioned by the Great War. See *Antiseptics*; *Surgery*.

**Flavouring**. Condiment put into food to give it a distinctive taste. Spices, herbs, and essences are flavourings, also lemons, juice of various fruits, onion and garlic.

**Flax** (*Linum usitatissimum*). Annual herb of the natural order Linaceae. Its native country is unknown; but it is found in a wild state, as an escape from cultivation, in every temperate country where it is grown for the production of linen or oil. Linen fabrics, thread, and stores of linseed have been found in excavations of the Stone Age. It is a slender plant, with erect stems, about a foot and a half high, and narrow, lance-shaped alternate leaves. The numerous flowers are comparatively large (1 inch diam.), and purplish-blue in colour. The flax fibres of which linen is woven are obtained by macerating the skin of the stems. Flax seed, from which linseed oil



Flax. Stem, leaves, and flowers of *Linum usitatissimum*

comes under pressure, leaving oil-cake as a valuable residue, is obtained from this species.

Flax is little grown in the United Kingdom, except in Ulster and some parts of Yorkshire. The seed is broadcasted or drilled, at the rate of 70 lb. to 80 lb. per acre in the former case, 40 lb. to 60 lb. in the latter, and the seed time varies from April to mid-May. Well-drained, deep loam is the most favourable soil. Rotation is necessary, and an average of seven years should elapse between two crops on the same land. It is not

usual to apply farmyard manure directly, for highly fertile soil is apt to cause "lodging"; but the preceding crop should be well dunged. Artificial, however, can be used with advantage: for flax production, 5 cwt. kainit or 1½ cwt. muriate of potash per acre; for seed production, a mixture of ½ to ¾ cwt. sulphate of ammonia, 3 cwt. superphosphate, and ½ to ¾ cwt. muriate of potash per acre.

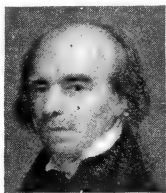
Flax should be cultivated on clean land, and when drilled, weeds must be kept down. Harvesting takes place in August, and the best fibre is obtained by hand-pulling, though the reaping hook and reaping machine are also used. The crop should be cut before the seed is quite ripe, for it matures in the stook (shock). The sheaves should be small. When grown on a large scale, it may be necessary to use the threshing machine, and this should be set close and run at a high speed. The best results, however, are obtained by the flail, afterwards crushing the seed-heads (bolls) with a roller; by passing the plants through a mangle; or by drawing them through a rippling comb, and afterwards using the roller. The average yield per acre is 36 to 40 cwt. dried straw (giving about 4½ cwt. fibre), and 8 to 10 cwt. seed.

The board of trade appointed a committee to investigate the question of increasing the supply of flax in the British Empire. In its report, issued June, 1920, reference was made to substitutes for flax, such as ramie, the main difficulty in preparing which for spinning was the elimination of the gum which holds the fibre together. Germany before the Great War had succeeded in discovering a process of degumming. This process was successfully transferred to England, and ramie yarns of very good quality are now produced in Yorkshire. The report showed that, while for a number of the purposes for which flax is employed substitutes exist, none of these can satisfactorily replace flax in the manufacture of fine linens, damasks, and similar articles. During the latter part of the Great War flax was controlled by a board set up for that purpose.

New Zealand flax (*Phormium tenax*) is a perennial herb of the natural order Liliaceae, native of New Zealand. The tough, leathery leaves are sword-shaped, springing from the root in two ranks, and from 3 ft. to 6 ft. in length. The dull, yellowish-red, tubular flowers, about 2 ins. long, are produced on short, alternate branches of a tall, flowering stem, 6 ft. or more in

height. See Linen; consult also Flax and its Products, H. R. Carter, 1920.

**Flaxman, JOHN** (1755-1826). English sculptor. Born at York, July 6, 1755, he was the son of a



John Flaxman

After Jackson

master of plaster casts. Going to physical deformity, his childhood in London was passed mainly in his father's shop, where he drew, modelled, and studied the classics. In 1770 he entered the Academy schools, having previously exhibited and gained awards at the Society of Arts, the Free Society of Artists, etc.; and in 1775 began to be regularly employed by the Wedgwoods in designing classical friezes and medallions for their ware. Married in 1782, Flaxman and his wife went to Rome in 1787. Returning in 1794, they settled in London. In 1797 he was elected A.R.A., and R.A. in 1800, and in 1810 was appointed professor of sculpture. He died Dec. 7, 1826.

Flaxman's most notable monumental works are in Westminster Abbey and St. Paul's, his classical figures and groups at Petworth, Woburn, and other country seats, and his characteristic memorial reliefs are numerous in the British cathedrals and churches. Collections of his drawings are in the British and South Kensington museums, and the Fitzwilliam Museum, Cambridge. University College, in Gower Street, London, contains in the Flaxman gallery a large number of his original drawings and sketches in pen and pencil, and also plaster casts from his clay models. See Sculpture.

**Flea.** Family of small wingless insects, more or less parasitic on other animals. The body is laterally compressed, and strongly encased in a coating of chitin; the last pair of legs is very long, enabling the insect to jump about 200 times its own length. The jaws are modified into a piercing instrument and a sucking tube, and the



Flaxman. Two examples of his work. Mercury and Pandora, from a cast now in University College, London. Above, Pandora endowed by Athena and Hermes, from an illustration to Hesiod's Works and Days

insect in the adult stage lives by sucking blood.

Most of the numerous species confine their attention to some one genus of the animal world. While a rat flea or chicken flea will on occasion attack man, it will not stay with him. The rat flea is known to be the conveyer of plague, and it is probable that other fleas also carry disease. The human flea (*Pulex irritans*) deposits its eggs in the dust of floors, where the white, worm-like larva feeds on decaying organic matter, taking about a month to attain maturity. See Insects; Parasite.

**Fleabane** (*Pulicaria* and *Erigeron*). Herbs of the natural order Compositae. *P. dysenterica*, a native of Europe, N. Africa, and the Himalaya, is a perennial, with creeping rootstock, erect stems, and heart-shaped, oblong, woolly leaves. The daisy-like flower-heads are bright yellow. It was formerly used as a medicine in dysentery. Canadian fleabane (*Erigeron canadense*), generally distributed in warm and

temperate regions, is an annual, with stem 1 or 2 ft. high, and narrow, lance-shaped leaves. The small, yellow-centred, white flower-heads are clustered.



pass to St. Cyr. Founded in 1774, this occupies the buildings of a Jesuit college, and has a large library. The earlier college, at which Descartes was educated, was founded in 1604 by Henry IV, to whom there is a statue in the market place. Pop. 10,700.



Flea. Much enlarged specimens. 1. Rat flea. 2. Common flea, *Pulex irritans*, male and, 3. female

1 Photographed at Nat. Hist. Museum, S. Kensington



Fleabane. Leaves and flowers of *Pulicaria dysenterica*

**Flèche, LA.** Town of France. It stands on the Loir, 24 m. from Le Mans, in the dept. of Sarthe. It is an agricultural centre, trading in corn, wine, etc., and has also some small manufactures; its buildings include a town hall, museum, and theatre. More famous is the military school here known as the Prytanée, from which students

**Fleece.** Coat of the live sheep removed by shearing and forming a fairly coherent mass by the interlocking of adjacent fibres. Fleeces deprived of some of their inferior portions are rolled into bundles, secured by a twist of their own fibre, and packed into bales or into bags known by the trade name of sheets. Locks and pieces are portions of the coat separated by accident or design from the main bulk or fleece. In the course of wool-sorting the fleece is opened out and examined. Fleeces of like quality placed together are described as cased.

Wool of different strengths grows upon different parts of the body, and in sorting wool fully the fleeces are broken up. When the respective sorts of wool from many fleeces have been collected together the lots are given the name of matchings. The term fleece wool in some parts of the country implies wool not of the first clip. Certain manufactured goods, *e.g.* warm linings, are called fleece from their warmth and fleecy appearance. *See* Woollen; also *illus. p.* 1181.

**Fleet.** In the naval sense, a number of ships under a single command. The word simply means to float or flow, hence its use in this connexion. At one time fleet was almost synonymous with squadron, but it is now used for a much larger unit. The whole of a navy is often called the fleet, *e.g.* the French fleet, and during the Great War there was the Grand Fleet (*q.v.*). *See* Navy; Squadron.

**Fleet.** Urban district of Hampshire, England. It is 6 m. N.E. of Odiham and 36 m. S.W. of London, having a station on the L. & S.W.R. Near the village is Fleet Pond, a sheet of water 130 acres in extent. Pop. 3,280. There is also a village of this name in Lincolnshire, 2 m. S.E. of Holbeach. Pop. 1,155.

**Fleet, THE.** Name of the navigable part of an old London river which, rising in Hampstead, entered the city S. of Chick Lane (now Charterhouse Street) and joined the Thames at Blackfriars. First mentioned in 12th century MS., it was known as the Fleet Ditch, owing to the frequency with which it became choked with refuse. The N. part was known as the Holbourne, hence Holborn. After the Great Fire of 1666 it was cleansed, deepened, and called the New Canal. Wharves were erected as well as bridges at Holborn, Fleet Lane, Fleet Street, and Bridewell. The part between Holborn and Fleet Street was arched over in 1737, and later the stream was converted into a sewer, its course being covered by Farringdon Street (*q.v.*) and New Bridge Street.

**Fleet Prison, THE.** Former prison of old London. Its history has been traced back to the 12th century. Named after the Fleet river, it stood on the E. bank of that stream, S. of Fleet Lane, was burnt in the Great Fire, re-



Fleet Prison. The inner court with prisoners engaged in a game of racquets

*From a drawing by Rowlandson & Pugin, 1807*

built, destroyed in the Gordon riots of 1780, rebuilt again in 1781-82, purchased by the City Corporation in 1844, used as a stone-yard, and sold in 1864 to the L.C. & D.R. On part of the site was erected the Memorial Hall. The prison was used for prisoners of the Star Chamber, and later for debtors and bankrupts. The register books are preserved at Somerset House.

The poet Surrey, Bishop Hooper, Thomas Nash, Dr. Donne, Falkland, Prynne, James Howell, Wycherley, and Richard Savage were among notable prisoners here; as, among literary creations, were Falstaff, Mr. Pickwick, and Shandon, the shiftless journalist of Thackeray's *Pendennis*. Here, and in the liberties, clergymen imprisoned for debt celebrated clandestine marriages, known as Fleet marriages, between 1614 and 1754, when they became illegal. Favoured debtors were allowed to live in what was known as the rules or liberty of the Fleet, which included the N. side of Ludgate Hill and the Old Bailey to Fleet Lane and Market, and along the E. bank of the Fleet to what is now Ludgate Circus. *See* Farringdon Street; consult also *The Fleet: Its River, Prison and Marriages*, J. Ashton, 1888; *The Chaplain of the Fleet*, W. Besant and J. Rice, 1881.

**Fleet Reserve, THE ROYAL.** British naval unit. It was constituted in 1901 as a scheme to secure the services in war of men who had retired from the navy. With the Royal Naval Reserve it was designed to form a reserve of personnel from which to draw in the event of war. Men composing it undergo a period of training.

They were called out on the outbreak of the Great War, and on Aug. 15, 1914, numbered 27,395. Their strength on Nov. 15, 1918, was 19,189. *See* Navy, British.

**Fleet Street.** London thoroughfare, in Farringdon Ward Without.

Running W. from Ludgate Circus to Temple Bar, its precincts are closely associated with the ecclesiastical, legal, theatrical, banking, publishing and printing activities of the metropolis. It contains two churches of note, S. Bride's and S. Dunstan's in the West, the remains of Clifford's Inn and the second Serjeants' Inn, part of the Law Courts, entrance to

the Temple (*q.v.*), and near to the last-named, a restored timber house of 1610, the projecting upper storey of which, called Prince Henry's Room, is described as the council chamber of the duchy of Cornwall in the time of James I.

On each side of Fleet Street are lanes and courts and squares, *e.g.* Chancery Lane, Fetter Lane, Shoe Lane; Bolt Court, Crane Court, Wine Office Court, Mitre Court; Gough Square and Salisbury Square—all with some interesting story to tell. Whitefriars Street still serves to remind the passer-by of the Carmelite monastery which once stood near; and Anderton's, the Cheshire Cheese, the Cock, Peele's, and the Rainbow represent the taverns and coffee houses of an earlier day. The site of the old Mitre tavern of Johnson's time is covered by Hoare's Bank, and that of the Devil tavern by Child's Bank.

Notable modern buildings are those of Child's Bank, the Law Courts branch of the Bank of England, the Norwich Union Insurance Co., and, in Bride Lane, the S. Bride Foundation Institute. Most of the buildings in Fleet Street are wholly or in part newspaper offices. Here are the chief offices of *The Daily Telegraph* and *The Daily Chronicle*, branch offices of *The Daily Mail* and *The Daily News*, and London offices of provincial, Indian, Australian, and American journals. The Great Fire of 1666 extended to Clifford's Inn on the N. side and to the Temple on the S. side, and after it the street was virtually rebuilt.

Wynkyn de Worde, the printer, worked at No. 32, near Temple Bar; Richard Tothill had his

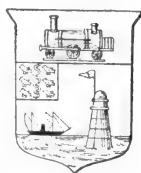


Fleet Street. Left, houses on the N. side between Chancery Lane and Temple Bar, as they appeared in 1799; right, the street, as widened, looking E. towards Ludgate Hill and S. Paul's

printing office in Fleet Street, and here Gorboduc, the first English tragedy, was printed and published. Punch offices were at the N.W. corner of St. Bride's Avenue; they are now in Bouverie Street. At No. 32 John Murray the first published Byron's *Childe Harold*, and John Murray the second, the early numbers of *The Quarterly Review*. On the site of Samuel Richardson's house in Salisbury Court is the office of Lloyd's News. Michael Drayton and Cowley lived in Fleet Street; Samuel Johnson in Bolt Court, Johnson's Court and Gough Square; Defoe stood in the pillory within Temple Bar in 1703. Our view of the N. side between Chancery Lane and Temple Bar is from a print by W. Capon. The timbered house with overhanging storeys and gabled roof was built in Henry VIII's time and destroyed in 1799. Izaak Walton lived in the house adjoining. The modern view is from H. Simonis's *The Street of Ink*, 1917. The legend of Sweeney Todd, the demon barber, originated in a tale published in 1840. London's first pillar-box was put up at Ludgate Circus in 1855. See London.

**Bibliography.** *The Highway of Letters*, T. Archer, 1893; *Annals of Fleet Street*, E. B. Chancellor, 1912; *Fleet Street in Seven Centuries*, W. G. Bell, 1912; *A Londoner's London*, W. Whitten, 1913.

**Fleetwood.** Urban dist., seaport, and watering-place of Lancashire, England. It stands at the



Fleetwood arms

mouth of the Wyre, 9 m. N. of Blackpool, on the L. & N.W. and L. & Y.J.R., of which it is a terminus. It owes its name and prosperity to Sir P. H. Fleetwood, who built quays and rlys., and planned the town in 1836. It has regular steamer service with the Isle of

Man and Ireland, and carries on a brisk coasting trade. The fisheries are extensive and much salt is produced for export. Fleetwood has a safe and commodious harbour; the Wyre Dock covers an area of about 10 acres, and has a large grain elevator. The council owns the electricity works, markets, free library, and recreation grounds, and a fine esplanade has been constructed. There is also a town hall. Market day, Fri. Pop. 19,448.

**Fleetwood, CHARLES** (d. 1692). English soldier. A younger son of Sir Miles Fleetwood, of Northamptonshire, he was trained for the law. He joined the Parliamentary army at the outbreak of the Civil War and afterwards commanded a regiment. In 1646 he entered the



Charles Fleetwood, English soldier  
After Walker

House of Commons as M.P. for Marlborough. He went with Cromwell into Scotland in command of the horse, and was present both at Dunbar and Worcester, being at the time of the latter battle in command of the troops in England. Fleetwood was then made

commander-in-chief in Ireland from 1652 to 1655, being also lord deputy until replaced by Henry Cromwell. Fleetwood was one of Cromwell's ten major-generals, and sat in his House of Lords. During Richard Cromwell's rule he was also influential. Fleetwood was commander-in-chief when Monk entered London, but at this time he hesitated, and was lost. He did not, as he thought of doing, go over to Charles, while the Parliament, again restored, took from him his command. Although he had taken no part in the trial of Charles I, he was exempted from a complete pardon at the Restoration. He died Oct. 4, 1692. In religion a Baptist, Fleetwood was a zealot, without any of the graces of some of the Puritans. He married, in 1652, Cromwell's daughter Bridget, the widow of Ireton, but their relations with the Protector were not uniformly cordial, although it is believed by some that the latter at one time intended Fleetwood to succeed him.

**Flegel, EDUARD ROBERT** (1855-86). German traveller. Born at Vilna, Oct. 1, 1855, he was appointed to a commercial post at Lagos, W. Africa, in 1875, and in 1879 surveyed the Benue river. In 1880 he ascended the Niger to Gomba and in 1882 discovered

the source of the Benue. Returning to Europe, he gained the interest of high German officials, and, backed by Bismarck, made another expedition to secure the Benue-Niger district for German trade. In this, however, he was forestalled by the British Niger Co. He died on the coast at Brass, Sept. 11, 1886.



Fleetwood, Lancashire. The quay and harbour  
By courtesy of L. & N.W. Ry.

**Fleming, JOHN AMBROSE** (b. 1849). British engineer and physicist. Born at Lancaster, Nov. 29, 1849, he was educated at University College, London, and St. John's College, Cambridge, where he gained a fellowship, and became lecturer on applied mechanics at Cambridge. In 1881 he took up the position of electrical engineer to the Edison Electrical Lighting Co. While professor at University College, London, and since 1910 of electrical engineering in the university, he remained in business as a consulting engineer and devoted much attention to radio-telegraphy.

**Fleming, MARGARET OR MARGORIE** (1803-11). Infant prodigy and favourite of Sir Walter Scott.



Margaret Fleming

After a water-colour by I. Keith

A niece of Mrs. Keith of Ravelston, at whose house Scott frequently saw her, she read history at the age of six and wrote diaries and poems which were preserved by her family. Her story is told in *Pet Margarie: A Story of Child Life Fifty Years Ago*, H. B. Farnie, 1858;

and Dr. John Brown includes an essay on her life and character in *Horae Subsecivae*.

**Fleming, SIR SANDFORD** (1827-1915). Canadian engineer. Born at Kirkcaldy, Jan. 7, 1827, he went to Canada and became connected with rly. construction about 1846. After 1871 the Dominion Government employed him to survey and construct the Intercolonial line, and afterwards he surveyed a route through the Rockies for the C.P.R. He advocated an imperial cable system and standard time. In 1897 he was made a K.C.M.G. He died at Halifax, July 22, 1915.

**Flemings.** Name given to the inhabitants of Flanders. A small sect of early Protestants, influenced by the Mennonites, were called Flemings or Flandrians about the middle of the 16th century.

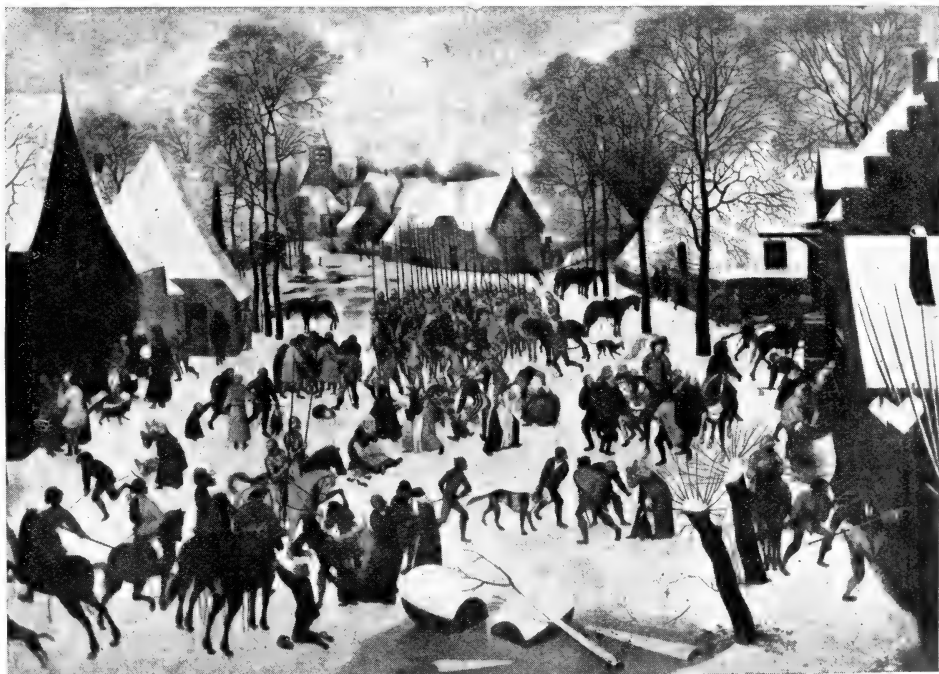
Flemish immigrants to England have frequently played a part in English and Welsh history. Early chroniclers speak of Tostig having Flemish auxiliaries under his flag at Stamford Bridge, 1066. Henry I settled a number of Flemings at Dyfed, in S. Wales, about 1108, who were long the objects of Welsh hostility. In the battle with the S. Wales marchers at Teifi Ford, near Cardigan, in 1136, large numbers of these Flemish settlers were

slain. Other attacks on them in 1144 and 1164 were avenged by their harrying of Iscold or Lower Gwent in 1165. Strongly attacked by the Welsh leader Maelgwyn Gwynedd in 1188, they made submission to Llewellyn I in 1217.

Flemings were important in the growth of the woollen and weaving industries in England, especially in E. Anglia. See Flanders.

**Flemington.** Suburb of Melbourne, Victoria. It is 3 m. from the city and has a fine racecourse, founded 1861, on which is run the race for the Melbourne cup. Pop. 6,109. See Melbourne.

**Flemish Art.** Art of Flanders. As it is difficult to distinguish between Dutch and Flemish painters, the word Netherlands is sometimes used for the school which suddenly attained power in the 15th century. There were distinct schools at Bruges, Ghent, and Antwerp. The earliest phases of the two first are still obscure; the first great masters of the Netherlands were the Limburg brothers, illuminators of Maaseyk. Next come the two Van Eycks, masters of the school. The so-called *Maitre de Flemalle* (possibly Robert Campin), Jacques Daret, Roger van der Weyden, Dierick Bouts, and Petrus Christus are the great names of the next



**Flemish Art.** Massacre of the Innocents, by Pieter Brueghel the Younger, typical of the detailed composition of the 16th century Flemish painters. This picture, in the museum at Brussels, is an exact copy of one by P. Brueghel the Elder in Vienna



generation. A little later comes Hans Memlinc and Hugo van der Goe, followed by Gerard of Haarlem (Geertgen of S. John), Gerard David, and Quinten Massys. This closes the list of the first-rank Netherlandish religious painters.

Their contemporaries were Jerome Bosch, the earliest satirist, and Patinir, the landscape painter.

with the mystic emotion of the French 13th century sculptors is found in the van Eycks, Roger van der Weyden, Dierick Bouts, and Hugo van der Goe, yet they echoed the intensity of the Gothic conception of the Christian drama. Withal they reflected the desire for richness and elaboration of detail inseparable from the Gothic ideal.

No Italian master rivalled the northern artists in this respect; nor, even when the technique of the Netherlands was practised in Italy, could any southern painters attain the brilliance and delicacy native to the transalpine schools. Indeed, the almost enamel-like perfection and durability of a van Eyck is unique.

At the same time it should be noted that, apparently derived from misall illumination, the technique and style of the Flemish were unsuited to the large issues of wall decoration which engrossed



Flemish Art. Barbara van Vlanderbeghe, by Hans Memlinc (c. 1430-94)  
Musée Royal, Brussels

**Bibliography.** The Flemish School of Painting, A. J. Wauters, Eng. trans. H. Rossell, 1885; Anciens Arts de Flandre, E. Durrand-Gréville, 1905; La Peinture en Belgique, H. Fierens-Gevaert, 1909; Art in Flanders, M. Rooses, 1914.

**Flensburg.** Seaport of Slesvig, Germany. It lies at the S. extremity of the Flensburg Fjord, about 23 m. N. of Slesvig town. Beautifully situated on the steep shores of the land-locked fjord, it has a good harbour, with shipyards, foundries, and breweries as the chief industries. Whaling



Flemish Art. A Canon with Patron Saints, by Gerard David (c. 1450-1523), a pupil of Hans Memlinc  
National Gallery, London

Mabuse represents the next phase of Flemish art, when it was invaded by Italian influence; the rococo period of excessive elaboration, compensated by no serious interpretation, is seen in B. van Orley, Mostaert, Jacob Cornelisz, and Cornelis Engelbrechtsen. Better masters were Lucas van Leiden and Scoreel. In this period was popularised the satirical genre picture best known in Marinus von Reyerswaal, whose Moneylenders and Misers are still famous. P. Aertsen of Amsterdam is a precursor on a large scale of Dutch genre. The great genre and landscape painter of the school, the last Flemish Primitive master, and one of the greatest, is Pieter Brueghel, the most original painter of his school. The influence of the Flemish masters of the 15th century in Germany and to a small extent in Florence was important. In Spain, too, and Portugal, the northern school left a deep impression, and in England, chiefly in East Anglia, Flemish painters for a short while had considerable business.

In the great Flemish Primitives, before Italian influence came north, the true Gothic spirit found some expression. If nothing comparable

the Italian painters. Only Brueghel attained a mural largeness of style. Even in recent times the influence of the Flemish Primitives has reasserted itself. For instance, the English school of Pre-Raphaelites owed much of its technique and vision to the masters of whom Rossetti and Holman Hunt became aware in Belgium in 1849. Commercially speaking, the Primitives are gilt-edged securities. Only within a comparatively short time have these masters met with this desirability in collectors' eyes. See Art; Dutch Art; Painting.

C. H. Collins  
Baker



Flemish Art. Madonna and Child Enthroned, by Dierick Bouts (c. 1410-75)  
National Gallery, London

vessels leave annually for the Greenland fisheries. Originally founded during the 12th century, Flensburg has several fine old buildings, notably the churches of S. Nicholas (14th century) and S. Mary (15th century). Formerly a Danish town, it was entered by German troops Feb. 7, 1864, and annexed with Slesvig. During the Slesvig-Holstein plebiscite after the Great War, there were serious disturbances in the town in Sept., 1919. The subsequent voting results showed a large majority for German rule. Pop. 60,922.

**Flers.** Town of France, in the dept. of Orne. It stands on the Vère, 40 m. from Caen. It has a 16th century château, and cotton spinning, bleaching, and dyeing works. Pop. 13,600. *Pron.* Flare.

**Flers.** Village of France, in the dept. of Somme. It is 3 m. N. of Guillemont and 5 m. E. of the Albert-Bapaume road. It was prominent in the battle of the Somme, being captured by the 41st and New Zealand divisions on Sept. 15, 1916, on which day the tanks were first used. Retaken by the Germans in their spring offensive, 1918, it was regained by the Allies at the end of Aug., 1918. *See* Somme, Battles of the.

**Flers, ROBERT DE** (b. 1872). French dramatist and writer. Born at Pont-l'Évêque, Nov. 22, 1872,



Robert de Flers,  
French dramatist

*Manuel*

1911; *L'Habit Vert*, 1912; *La Belle Aventure*, 1913. Also a well-known journalist, he became assistant editor of *Le Figaro* under Gaston Calmette, in April, 1914, succeeding him as editor, with Alfred Capus, in June. He resigned this post in 1920, rejoining the paper in 1922.

**Fleshly School of Poetry.** *THE.* Derivative name given to certain 19th century poets, chiefly D. G. Rossetti and A. C. Swinburne. It originated in an article in *The Contemporary Review*, entitled *The Fleshly School of Poetry and Other Phenomena of the Day*, by Thomas Maitland (Robert Buchanan), which was afterwards published as a pamphlet, 1872. Swinburne replied in *Under the Microscope*, 1872. Buchanan later made a full *amende honorable* in regard to Rossetti's work.

**Flesquières.** Village of France in the dept. of Nord. It is S. of Bourlon Wood, 1½ m. S. of the Bapaume-Cambrai road, and 2 m. W. of Marcoing. Here on Nov. 20, 1917, in the first battle of Cambrai the British encountered stubborn German resistance. Taken by the British, Nov. 21, it was evacuated in March, 1918, and regained at the end of Sept., 1918. *See* Cambrai, Battles of.

**Fletcher, ANDREW, OF SALTOUN** (1655-1716). Scottish politician. Born at Saltoun (now Salton),



Andrew Fletcher,  
Scottish politician

*After Aikman*

East Lothian, he was educated by the parish minister, Gilbert Burnet, afterwards bishop of Salisbury. He sat as a commissioner in the Scots convention of estates in 1678, and vigorously opposed the government. In 1685 he joined Monmouth's expedition to England, but, having killed a man in a private quarrel, fled to Spain. He returned in 1688 with William of Orange, and became a determined opponent of the Union. He is remembered by the remark from his *Account of a Conversation*, "I knew a very-wise man, so much of Sir Christopher's (Sir Christopher Musgrave's) sentiment, that he believed if a man were permitted to make all the ballads, he would not care who should make the laws of a nation."

**Fletcher, ALFRED EWEN** (1841-1915). British journalist. Born at Long Sutton, Lincolnshire, and educated at Owens College and Edinburgh University, he was for a few years engaged in the teaching profession. In 1872 he entered journalism, and in 1878 became

leader writer

on *The Daily Chronicle*, which he edited from 1890 until he resigned in 1895. He contested Greenock as an independent radical in 1895, and the Camlachie division of Glasgow as a radical and labour candidate in 1900. He edited *Sonnenschein's Cyclopaedia of Education*, 1889, contributed a monograph on Gainsborough to the *Makers of British Art* series, and published *The Sermon on the Mount and Practical Politics*, 1911. He died Nov. 14, 1915.



Alfred E. Fletcher,  
British journalist

*Elliot & Fry*

**Fletcher, BANISTER FLIGHT** (b. 1866). British architect and author. Born in London, Feb. 15, 1866, he studied at the R.A., and elsewhere. A barrister and a traveller, he practised also as an architect, and lectured on architecture. His books include *A History of Architecture on the Comparative Method*, 5th ed. 1905, *A Life of Palladio*, 1902, and other works.

**Fletcher, GILES** (c. 1588-1623).

English poet. Brother of Phineas and cousin of John Fletcher, the dramatist, he was educated at Westminster and Cambridge, and died rector of Alderton, Suffolk. His principal work, an allegorical poem entitled *Christ's Victory and Triumph*, 1610, was modelled on Spenser's *Faerie Queene*, and influenced Milton.

**Fletcher, JOHN** (1579-1625). English poet and dramatist. Son of Dr. Richard Fletcher, he was born

at Rye, Sussex, and educated at Benet (Corpus Christi) College, Cambridge. On his father's death, being left without means, he took to writing for the stage, collaborating with Francis Beaumont and others in plays which introduced tragi-comedy to the English theatre. Independently he wrote fifteen plays, including *The Faithful Shepherdess* (a beautiful pastoral play), *Valentinian*, *The Wild-Goose Chase*, *Monsieur Thomas*, *Woman's Prize* (a sequel to *The Taming of the Shrew*), *A Wife for a Month*, and *The Chances*. He also collaborated with Massinger, Middleton, Rowley, Field, and Daborne.



John Fletcher,  
English dramatist

*From an old engraving*

To what extent Fletcher was responsible for *The Two Noble Kinsmen* and *Henry VIII* remains a vexed question. He wrote beautiful lyrics and some of the raciest dialogue in English dramatic literature, and the free movement of his blank verse is a clue to his contributions to plays partly written by others. He died of the plague and was buried in S. Saviour's, Southwark. *See* Beaumont; consult also John Fletcher, O. L. Hatcher, 1905; *Works of Beaumont and Fletcher*, ed. A. Dyce, 1843-46; A. Glover and A. R. Waller, 1905-12.

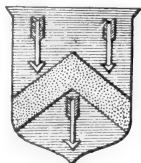
**Fletcher, JOSEPH SMITH** (b. 1863). British author. Born at Halifax, and educated at Silcoates School, he wrote much for Yorkshire and other papers, signing many of his contributions, *Son of the Soil*. His many books include

works of topography, novels, etc.; among them *A Picturesque History of Yorkshire, 1899-1903*; *A History of the St. Leger Stakes, 1902*; *The Threshing Floor, 1905*; *Mothers in Israel, 1908*; *Recollections of a Yorkshire Village, 1910*; *Memories of a Spectator, 1912*; *Perris of the Cherry Trees, 1913*; *The Annexation Society, 1916*; *Seahaven Keep, 1920*; *Exterior to the Evidence, 1920*.

**Fletcher, Sir Lazarus** (1854-1921). British scientist. Born at Salford, Mar. 3, 1854, he was educated at Manchester Grammar School and Balliol College, Oxford. Having taken a very good degree in science and mathematics, he was appointed a demonstrator in the Clarendon Laboratory at Oxford, and chosen fellow of University College. He remained lecturing in Oxford until 1890, when he was appointed keeper of minerals in the natural history department of the British Museum. He was promoted to be director of the department in 1909, and he resigned in 1919. In 1916 Fletcher was knighted, and his many honours include an F.R.S. From 1888 to 1909 he was secretary of the Mineralogical Society. His published works include *Introduction to the Study of Minerals, 1884*; *Introduction to the Study of Rocks, 1895*. He died Jan. 6, 1921.

**Fletcher, Phineas** (1582-1650). English poet. Phineas was brother of Giles Fletcher, and, like him, an imitator of Spenser. He died rector of Hilgay, Norfolk. His works have been edited by Grosart, 1868, the most important being a poem of 4,800 lines entitled *The Purple Island*, an extraordinary allegory of the human body.

**Fletchers' Company, THE.** City of London livery company. Of ancient origin and associated with the Bowyers, the

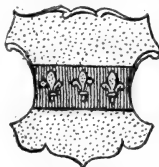


Fletchers' Company arms

have been lost, the earliest extant being dated 1775. The offices are at 4, Broad Street Place, E.C.

**Fleur-de-Lis** (Fr., lily-flower). In heraldry, an extremely ancient symbol. Found among Egyptian hieroglyphics and used by the Anglo-Saxon kings, it was probably a conventional representation of some such flower as the lotus, river side flags, or the iris. It consists of a central bulbous petal and two side curving petals, a fillet and a

stalk, usually triparted. The fleur-de-lis was early assumed as a cognizance by the Carolingian kings



Fleur-de-Lis, in heraldry

and so became identified with the royal houses of France, who bore the golden flowers on a blue shield. At first the shield was strewn with the lis, but occasionally only three appeared, some say in allusion to the Holy Trinity, a fashion which became permanent under Charles VI. The French arms (azure, semée de lis d'or) was quartered with the arms of England by Edward III; Henry IV reduced the number of lis to three, and after the treaty of Amiens and the Union with Ireland in 1801, the French quartering was omitted from the arms of the English royal family. *Prim. Fleur-de-leess. See ill. p. 1549.*

**Fleurus.** Town of Belgium, in the prov. of Hainault. It stands in a plain, 8 m. N.E. of Charleroi, and is a junction for the rly. to Gembloux, Landen, and Nivelles. There is a steam tramway to Namur. Four important battles have been fought near this small Belgian town. In the first the duke of Brunswick defeated the Spaniards under Cordova, Aug. 29, 1622. Under Marshal Luxembourg the French gained a victory over the allied Spanish, Dutch, and Germans, July 1, 1690. On June 26, 1794, the French inflicted a crushing defeat upon the Austrians and forced them to evacuate Flanders. Finally, Napoleon here defeated the Prussians, June 16, 1815, in the battle usually known as the battle of Ligny (*q.v.*). Pop. 6,100.

**Fleury, FLORY, OR FLOWERY.** In heraldry, any charge decorated with fleurs-de-lis. Examples are crosses at the ends of the limbs or in the angles, on the tressure, and on sceptres, etc. *See ill. p. 2375.*

**Fleury, in heraldry**

**DRÉ HERCULE** (1653-1743). French statesman. Born at Lodève, Hérault, June 22, 1653, he was educated at Paris, took holy orders, and became chaplain to Louis XIV, who made him bishop of Fréjus in 1698, and tutor to the future king Louis XV in 1715.

In 1726 he became chief minister and was appointed cardinal. His administration was upright and



De fleury  
After Rigaud

strictly economical, but he did nothing to check the early dissipation of the king or the abuses of the farmers-general. His foreign policy was directed chiefly towards ensuring peace, and to this end he worked closely with the English minister Walpole. The French intervention in Polish affairs in 1733 was undertaken against his better judgement, but he failed to prevent France from being involved in the war of the Austrian Succession, 1740, and died discouraged and in ill-favour, Jan. 29, 1743.

**Fleury, CLAUDE** (1640-1723). French church historian. Born Dec. 6, 1640, at Paris and educated there, he practised for nine years as an advocate, and then devoted himself to theology. In 1672 Louis XIV entrusted him with the education of the young princes, and he became nominally the abbot of Loc-Dieu and later prior of Argenteuil. From 1691 onwards he was writing his *Ecclesiastical History* in 20 volumes. He died July 14, 1723.

**Flexner, SIMON** (b. 1863). American pathologist. Born March 25, 1863, at Louisville, Kentucky, he took his medical degree in 1889 and studied in Germany. Professor of pathological anatomy at Johns Hopkins University, 1891-99, he was from 1899-1904 professor of pathology at Pennsylvania University. In 1903 he was given charge of the laboratories of the Rockefeller Institute for Medical Research, where his researches added largely to our knowledge of the causes of infantile paralysis.

**Fliebertigibbet** OR DICKIE SLUDGE. In Scott's novel *Kenilworth* (*q.v.*), a mischievous but ambitious dwarf, in league with Wayland Smith in deceiving the Berkshire villagers.

**Fliegende Blätter, DIE** (Flying Leaves). German weekly illustrated comic paper. Established in 1844, it is published in Munich.

# FLIGHT: IN THEORY AND PRACTICE

J. Laurence Pritchard, Editor, *The Aeronautical Journal*

*In this article are described the main underlying principles that have made possible the conquest of the air. For the history of flight and aviation consult Aeronautics. See also Aeroplane; Airship; and the articles on the various types of machine*

Though for many centuries attempts have been made to discover the principles of flight, it was not till Langley in America made his experiments on a scientific basis in 1890-1900 that any real advance was made. Langley showed that a flat plate of material could be made to support itself if forced through the air at a certain angle, and at a certain speed. He announced that a weight of 750 lb. could be lifted by an engine of 25 h.p. The experiments of Lilienthal

freedom to alter the shape of its wings as the bird has. In place of flapping wings we find the airscrew, and a vertical fin and rudder for steering and control purposes, not observable in the bird. But the principles of bird flight and human flight remain identical.

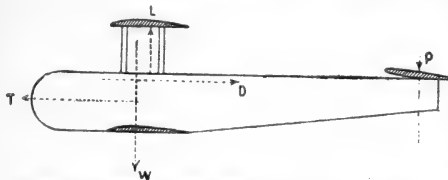
An aeroplane flies as a result of the support given to it by its wings when the latter are being driven through the air. As the aeroplane moves forward, the wings, owing to their curved shape,

drive downwards the air through which they pass. Called by Lord Rayleigh the "sacrificial" principle, this principle of flight is an expression of the fact that if you do not want to fall yourself you must make something else fall. It is the constant falling of

particular angle at which the wings are set. If the speed of the aeroplane is increased, then the angle of the wings must be altered to satisfy this principle. The curved wing has the great advantage over the flat wing that its resistance is relatively much smaller at the usual flying speeds.

There is one important aspect of mechanical flight which is relatively unimportant in bird flight, and that is flying at great heights. An aeroplane has flown to a height of 5 m., and the conditions of flight at such a height, where the mercury stands at 10 ins. instead of 30 ins., are very different from those on the ground. Here another principle is enunciated, namely at the same altitude and speed of flight of the aeroplane the air force is proportional to the air density. The problem is further complicated by the fact that the power of an engine decreases more rapidly than the density of the atmosphere.

The general laws of flight are simple, but their detailed applications often present insuperable theoretical difficulties which can only be solved by experiment on model or full-sized aeroplanes. In steady horizontal flight the lifting force on the wings is equal to the total weight of the aeroplane, in climbing flight it is greater, and in diving flight it is less. These are simple laws, but to calculate exactly how much greater the lifting force is under certain conditions, in order to find out how fast an aeroplane will climb, is not nearly so simple. The calculations are complicated by the varying density of the atmosphere and consequent varying efficiency of the engine. The solution of these com-



**Flight.** Diagram of the forces acting on an aeroplane in horizontal flight. T, the thrust of the propeller; L, the lift on the wings; W, the weight of the aeroplane; D, the resistance or drag; and P, the force on the tail plane to maintain equilibrium

and others added that curved surfaces were better than flat ones for flying purposes.

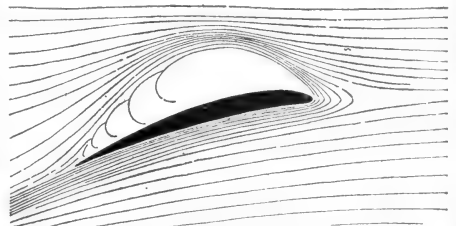
Air resists the rapid passage of any body through it, and this resistance is proportionately less, compared with lifting-power, in certain curved surfaces than in flat surfaces. But though the surface was discovered, the next step forward, that of the discovery of the engine which could force it through the air at the necessary speed, remained in abeyance till the invention of the petrol engine, though Sir Hiram Maxim actually lifted 10,000 lb. off the ground, using a steam engine. With the advent of the internal combustion engine and the experiments resulting in the present-day curved or cambered wing, flying became possible.

The study of the flight of birds has had a marked result on the ultimate methods of flight adopted by man, with certain differences largely due to mechanical difficulties. The aeroplane has its wings and balancing tail, and a certain

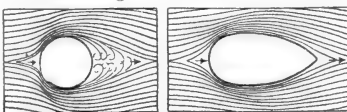
the air, as it were, which gives that support necessary for flight to the aeroplane. Exactly how the air is made to move downwards by the curved wings of an aeroplane is a matter of experiment, the theoretical solution of the problem being beyond the power of present-day mathematics.

It was early discovered that the air is forced downwards in a way depending upon the angle at which the wings are set to the air, and also the speed at which they are forced through the air. With the wings set at any particular angle it was found that the lifting power increases as the square of the speed. But with the increase of speed there naturally comes increase of resistance to forward

motion, requiring increased engine power to overcome it, and, therefore, increased weight, so complicating the problem. The principle which may be stated here is that in any given aeroplane there is only one speed of flying for a

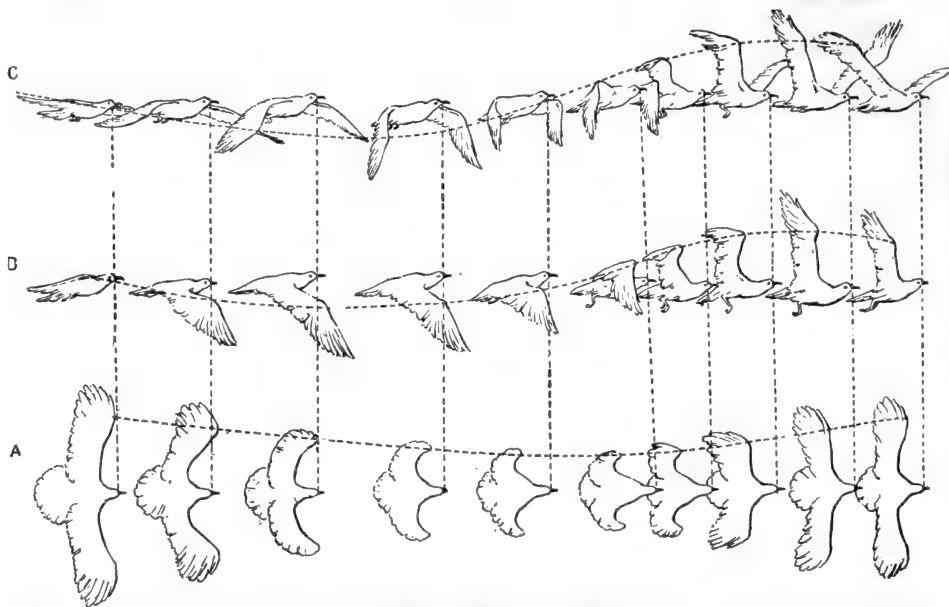


**Flight.** Diagram showing how the stream of air is deflected by the curved wing, shown in section in black, of an aeroplane. The air is forced downwards at the rear or trailing edge of the wing, and a partial vacuum is created above the wing with increased pressure below it, so making it lift



**Flight.** Diagram representing the difference of air flow past a round body and a stream-line body

lications depends upon a very large number of experiments carried out in the wind tunnels at the National Physical Laboratory, and practical flying experiments at the Royal Aircraft Establishment and at Martlesham, as well as corresponding experiments in America,



Flight. Diagrams illustrating the flight of a pigeon viewed from three standpoints; A, from above; B, from the side; C, obliquely from side and front

After the diagram by E. J. Marey in "Movement," by permission of Wm. Heinemann

France, Italy, Germany, and Russia. Many problems await an answer, but in the main it may be stated that the great problem of safe flight has been solved.

The problem of stability in flight is one which has been for all practical purposes solved, though the actual mechanical contrivances for maintaining that stability have not yet reached the state of perfect automatic response found in birds.

The problem is complicated in that, though the surfaces, both main and control, may be sufficient to maintain equilibrium for a particular speed of flight, they are not sufficient at some other speed. Many of the aeroplanes used during the Great War, for example, were stable at some flying speeds, but not at others. The rudder of an aeroplane is used to give directional control, i.e. for turning; the ailerons or wing-flaps to bank the aeroplane when turning in order to prevent it side-slipping; the elevators for altering the incidence of the main planes and so altering the speed of flight. If all or any of these control surfaces are insufficient, the aeroplane will be unstable or uncontrollable at some particular speed.

The control system of the modern aeroplane is so arranged that the natural movements made by the pilot are those which make the aeroplane manoeuvre as he would expect from those movements. He leans forward and

pushes the joy stick forward, and the aeroplane tends to dive; he moves back, pulling the joy stick back, and the aeroplane puts its nose up. Moving the joy stick to the right, and conversely for a left-hand movement. The rudder bar is worked by the feet, and pressure on it with the right foot causes the aeroplane to move to the right, and conversely. The joy stick is connected by wiring to the ailerons and elevators, and the rudder bar similarly to the rudder.

**FLIGHT IN NATURE.** In nature the power of flight is possessed by most birds, most insects, and all the bats. The flying fish springs out of the water and skims along for some distance by the aid of its winglike fins, but it is very doubtful if any true propulsive movement is made by them. The so-called flying squirrels, lemurs, and lizards do not really fly. They are merely able to stretch out the loose skin of their sides to form a kind of parachute by the help of which they are able to take long flying leaps through the air from one tree to another. The principles of flight in birds, bats, and insects are identical with those of the aeroplane, though manifested in different ways. In all there is the cardinal principle that air is forced downwards in order that the bird or insect may sustain itself in flight. This forcing down of air is accomplished by the beating of the wings,

in contradistinction to the forcing of the air past a curved surface and so downwards by means of an air-screw as in the aeroplane.

Soaring flight calls for some attention here. It is well known that certain birds, as the albatross, are able to keep in the air for long periods without any appreciable flapping of their wings. This soaring flight is not peculiar to birds or insects, aeroplanes soaring in an exactly similar way. Soaring flight is possible where there are currents of air moving upwards, as Lord Rayleigh and Prof. Langley have shown. These currents act as the necessary source of energy to support the bird or the aeroplane, though naturally they must be much stronger for the latter. Such upward currents, usually very local, exist round coasts, mountainous country, hot ground, etc., and an upward wind of 5 m. an hour is not uncommon. Soaring flight is, however, only possible for short distances in aeroplanes. The speed of an upward current for soaring flight is proportional to the speed of flight of the aeroplane or bird, so that the latter with their slower flying speeds are able to soar where an aeroplane cannot.

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**Flight Lieutenant.** In the R.N.A.S., the rank equivalent to that of lieutenant in the R.N. and of captain in the army, and originally confined to pilot officers. In the Royal Air Force the title has been revived for the equivalent rank, but it has been extended to all officers of that rank in that force. See *Air Force*, Royal; *Naval Air Service*, Royal.

**Flight Path.** The line which represents the course of an aircraft in flight. See *Aeronautics*.

**Flinck,** GOVAERT (1615-60). Dutch painter. Born at Cleves, Jan. 25, 1615, he was one of Rembrandt's most successful pupils. His earlier work, painted under the influence of the master, is of greater value than his later Italianate style of court painting. Notable works are *The Annunciation to the Shepherd*, Louvre; *The Grey Bearded Man*, Vienna; *The Expulsion of Hagar*, Berlin, painted for the elector of Brandenburg, and *The Civic Guard Fête*, Amsterdam. He died at Amsterdam, Feb. 2, 1660.

**Flinders.** River of Queensland, Australia. It issues from the N. extremity of Lake Neelia in Rupert co., and flows a generally N.W. course of about 220 m. to discharge into the Gulf of Carpentaria, 10 m. S.W. of Kimberley. It was named after Matthew Flinders (1760-1814), the navigator and hydrographer, who surveyed the coast of Australia.

**Flinders,** MATTHEW (1774-1814). British sailor. Born March 16, 1774, the son of a surgeon, in 1790 he went to transplant bread-fruit trees from the South Sea Islands to the W. Indies. Returning in 1793, he was posted to the *Bellerophon*, saw action on the Glorious First of June (1794), and sailed in the *Reliance* to New South Wales, where he began a series of explorations lasting until 1799, circumnavigating Tasmania, which was hitherto supposed to be part of the mainland.

In 1800 Flinders was appointed to the *Investigator*, and again sailed (1801) for Australia, where he charted the Gulf of Carpentaria, and surveyed the coast of New Holland. On his voyage home, unaware that Britain and France were at war, he was detained by the French at Mauritius, and imprisoned, 1803. In June, 1810, he was released and made his way to

England, where he wrote an account of his discoveries. He died July 19, 1814.

**Flindersia.** Small genus of evergreen trees of the natural order Meliaceae. Natives of Australasia and the Moluccas, they have hard, close-grained wood of a yellow tint, useful for many purposes. *F. australis* (Crow's Ash), found in Queensland and New South Wales, grows to a height of 60 ft., with smooth, flaking bark, and alternate leaves broken into three to six oblong leaflets. The numerous small white flowers are in dense clusters. The wood is very durable. The trees are named after Matthew Flinders (q.v.).

**Flint.** Crystalline mineral composed mainly of silica; a variety of chalcedony. It is compact, almost opaque, usually dark grey or brown, somewhat harder than steel, and breaks with a shell-like fracture, forming sharp-cutting edges. When first unearthed it is brittle, becoming toughened by exposure. Chert and hornstone are coarser forms.

In Great Britain and W. Europe flint occurs mainly in the middle and upper chalk formations, where it forms irregular nodules, tabular masses, and veins. It is also scattered through tertiary gravels and alluvial soils, sometimes in great numbers, derived from disintegrated chalk rock. The nodules, sometimes several feet across, are often the silicified remains of sponges, or are hollow shells formed by the concretion of gelatinous silica around urchins, sponges, and other marine organisms. When this dense, non-crystalline constituent, the cause of black flint, is removed, white flint results. The veins were deposited in joints and fissures in chalk rock, carbonate of lime being displaced by dissolved silica of organic origin.

The cutting edge produced by flaking enabled palaeolithic man to invent edged tools, prior to the introduction of metallurgy. Utilising at first water-worn pebbles or cliff-exposed nodules, this industry led to flint-mining. The discovery that sparks are produced when flint is struck with iron pyrites brought about the percussive method of fire-making. In medieval E. Anglia flint was largely used in church-building, walls being made of undressed or split flints, and porches and battlements panelled with squared flints, some-

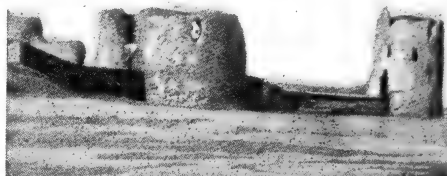
times in beautiful colour zones. As road metal it is unsatisfactory because of its readiness to pulverise. This quality is utilised for pottery and optical or flint-glass. A snow-white quartz powder is obtained by heating flints and throwing them into cold water. In France



Flint arms

they are crushed between chert blocks and exported to Great Britain and America. In Essex and the home counties S. of the Thames there is a normal annual output of 30,000 tons, and a similar output in Belgium. See *Chalk*; *Flint Implements*.

**Flint.** Mun. bor., formerly the county town of Flintshire, Wales. It stands on the S. shore of the Dee estuary, 12 m. N.W. of Chester



Flint, Wales.

Ruins of the castle built by Edward I

on the L. & N.W.R. In earlier times an important harbour, the accumulation of sand in the estuary now keeps the tidal waters away from the town. Hundreds of acres of marshland in the estuary could be profitably reclaimed. Artificial silk is made here. There are alkali and copper works, and lead and coal mines in the neighbourhood. The castle, built by Edward I, was the scene of the meeting between Richard II and Bolingbroke, described by Shakespeare, and was twice captured by the Parliamentarians and dismantled in 1647. It was taken over by the office of works in 1920. Market day, Sat. Pop. (1921) 6,302.

**Flint.** City of Michigan, U.S.A., the co. seat of Genesee co. It stands on Flint river, 70 m. by rly. N. by W. of Detroit, and is served by the Grand Trunk Western and the Père Marquette rlys. It contains a Federal building, a state asylum for the deaf and dumb, a city hall, a high school, and a public library. It is a centre for the manufacture of motor-vehicles, wagons, and carriages, and has woolen, flour, cigar, and lumber industries. Settled in 1820, it received a city charter in 1855. Pop. 70,100.

**Flint.** River of Georgia, U.S.A. Rising in the N. part of the state, it flows 350 m. generally S.W. to unite with the Chattahoochee in



From an engraving

forming the Apalachicola. Large vessels ascend to Bainbridge, 50 m. up, and for smaller craft it is navigable for a further 100 m.

**Flint Implements.** Primitive tools and weapons made of flint. The term popularly includes quartzite, chalcedony, felsite, chert, hornstone, and other siliceous stones. Perhaps originating in N. Africa, and traceable in a rudimentary form in the dawn of prehistoric Europe, they reached a high level of development during the Stone Age. When flint is broken up by percussion or pressure a conchoidal or shell-like fracture results, with a bulb of percussion where the blow falls. The products are classed as nodules, cores, flakes, chips, and splinters. Prolonged exposure causes a characteristic tinting or patina.

Palaeolithic workshops—with anvil-stones, discarded cores, and spoiled implements—are plentiful, as at Crayford, Kent, and Caddington, Beds. The early neolithic industry is revealed at Campigny and Grand Pressigny, France; later British factories are Grovehurst, Kent; Skelmuir, Aberdeenshire. Early flint mines have been localised at Spiennes, Belgium, Cissbury Hill, and Grime's Graves. The last flint-knapping for gun-flints and strike-a-lights survived at Brandon, Suffolk, until 1917. English flints are sometimes 9 ins. long; the finest, sometimes 14 ins. long, come from predynastic Egypt and from Denmark, with exquisite ripple-markings.

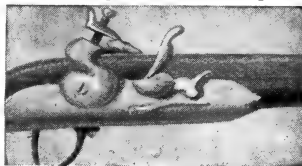
Implements of remote date are found in S. and W. Africa, Somaliland, Palestine, India, Burma, and America; their production survives in various parts of the world, e.g. in Australia. Pygmy flints,  $\frac{1}{2}$  in. to  $\frac{1}{4}$  in. long, traceable in the upper palaeolithic age, became commoner in the mesolithic Tardenoisian; they range from Britain (E. Lancashire; Scunthorpe, Lincs.) across Europe to Egypt (Helwan), and thence to India in the Vindhya hills. See Celt; Eolith; Neolith; Palaeolith; Tomahawk; also Anthropology and Aztec, illus.

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**Flint Lock.** Musket in which ignition of the powder is obtained by a mechanical device causing a piece of flint to be struck on a steel hammer when the trigger is pulled. Chiefly owing to the fact that this type of lock is also known as a Snaphaunce, from the Dutch word for poultry thief, the inven-

tion has been ascribed to a Dutch source. A Spanish origin has also been suggested, but it is not improbable that the idea was first obtained by Portuguese traders from Japanese tinder boxes.

A piece of flint is held in the jaws of the cock, whilst the hammer is so arranged that it also serves as a cover for the flash-pan, preventing the priming falling out or getting wet, being held in position by an external spring. In the illustration the lock is at half-cock, and is unaffected by pressure on the trigger. When the cock is pulled farther back the piece is ready to fire, and on pressing the trigger the cock flies forward, the flint knocking the hammer back and allowing the shower of sparks



**Flint Lock.** Mechanism of firing device of a 17th century musket to fall in the flash-pan and ignite the priming.

The early flint locks were not very reliable, and a match-lock was frequently fitted in addition. Flint lock weapons became common about 1630, and were introduced to England in the reign of William III, and gradually became the favourite weapon, until the use of percussion caps displaced them. Flint lock weapons were the standard equipment of the British army until 1840. See Gun; also Brown Bess, illus.

**Flintshire.** Northern maritime and the smallest co. of Wales. It lies to the W. of the Dee estuary, with a detached portion situated E. of Denbighshire; area, 255 sq. m. A hill range partly crosses the co. parallel to the Dee estuary, which at low tide is a sandy waste. The co. contains the lower courses of the Dee and Clwyd; there are several valleys of considerable



**Flintshire.** Map of the county showing the detached portion between Cheshire and Shropshire

beauty, and in these the soil is fertile and under cultivation. Butter and cheese are produced in fair quantities. Coal, lead, iron, and other minerals are worked. There are ironworks along the Dee estuary; artificial silk, flannel, and cement are manufactured. The L. & N.W. is the chief rly. Mold, the county town, Rhyl, Flint, Buckley, Connah's Quay, and Holywell are the largest towns. One member is returned to Parliament for the county. Pop. (1921) 106,466.

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**Flintshire Lead Process.** Air reduction process which has been used from very remote times in N. Wales. Pure ores obtained from limestone formations are used. The furnace is of the reverberatory type, having the hearth sloping to a central well, from the bottom of which a tap hole leads to a pot outside. A preliminary roasting of the charge on the hearth is followed by a raising of the temperature till the lead begins to run freely, then by a further rise to melt the charge down, the introduction of lime, stirring and mixing, a further roasting, draining, the introduction of a little coal slack to finish, and the tapping out of the metal. See Lead.

**Flite, Miss.** Character in Dickens's *Beak House*. One of the victims of the law's delays, she is a little mad old woman who is always in court, and who, though she has lost her reason, still retains her tenderness of heart.



**Flintshire arms**

**Float.** Raft or a quantity of timber secured together for floating or towing through water. It also means a float board of a paddle steamer or water wheel; a piece of wood or a closed, watertight, metal case which floats, used for various purposes such as actuating cistern valves, indicating depth of water in tanks and reservoirs, and gauging the velocity of streams; an angler's accessory; and a plasterer's tool for floating or rendering smooth a surface of cement, mortar, or plaster. The word is also used for the light hollow vessel or cork body used in the engine carburetter.

**Floating Battery.** Obsolete method of carrying big guns for use afloat. Floating batteries as such were used in the Crimean War.

**Floating Debt.** Name given in the United Kingdom to that part of the national debt which is not funded. It consists mainly of treasury bills, but also of advances made by the Bank of England and by government departments. On June 12, 1920, the floating debt amounted to £1,301,020,000.

In 1919 and 1920 the enormous amount of the floating debt was considered to be one of the chief reasons of the rise in prices. The idea behind this theory was that the creation of treasury bills gives their holders borrowing powers and so increases the demand for money,

thus leading to higher prices. If this debt were not floating but funded, it would be held in the main by genuine investors who would not raise money on their securities. *See Credit; National Debt; National Finance.*

**Floating Island.** Floating mass of peaty vegetable materials. Such materials collect in the shallower parts of the floor of a lake, and are probably made temporarily buoyant by the formation of gases produced by their decomposition.

**Floating Kidney.** Condition in which the kidney is abnormally mobile and can be freely moved within the abdomen by manipulation. Lesser degrees of the condition are known as palpable kidney and movable kidney. The causes of floating kidney are repeated pregnancies, tight lacing, displacement of the organ by tumours, and a general sagging down of the viscera known as *enteroptosis*. Mild cases can be treated by suitable padding and bandaging of the abdomen.

**Float Seaplane.** Type of aircraft capable of rising from and alighting on water by means of floats. Except for the floats, which replace the ordinary wheeled type of undercarriage of the land aeroplane, the construction of the float seaplane follows that of other heavier-than-air craft. Float seaplanes, as the Short, Fairey, etc.,

were extensively used during the Great War. *See Fairey; Flying Boat; Short.*

**Floculi** (Lat. *flocus*, a lock of wool). Bands of bright woolly matter parallel to the sun's equator which appear upon certain types of solar photographs. *See Sun.*

**Flock** (Lat. *flocus*, a lock of wool). Stuffing for beds and upholstery, a by-product in woollen manufacture. Short and more or less curled fibre is brought away from woollen piece goods in the course of finishing, notably in scouring, milling, and shearing the face of cloth. Again flocks are generated in pulling well-worn woollen rags to their constituent fibre. In Great Britain, under the Rag Flock Act of 1911, a test standard of cleanliness has been set up which applies both to flocks produced from new cloth and to rag flock. *See Wool.*

**Flock Book.** Register of sheep. Special societies, dealing with almost every variety of sheep, publish a flock book in which all pure-bred animals belonging to members are registered and the points of the breed laid down officially. *See Sheep.*

**Flodden, BATTLE OF.** Fought between the English and the Scots, Sept. 9, 1513. Flodden is a ridge of the Cheviots on the English side of the border. It is 3 m. S.E. of Coldstream, and nearer is the village of



Flodden. The Morning of Flodden. James IV of Scotland receives news of the strength of the English forces under the earl of Surrey. From the picture by John Faed, R.S.A.

Branston. Along it runs the road to Scotland, and near is the Till, flowing to join the Tweed.

Suddenly renewing the war with England, James IV crossed the border on Aug. 22 with a large army and besieged Norham Castle. Surrey collected an army and marched N., for Henry VIII was fighting in France, learning on the way that Norham and other castles had fallen to the invader. On Sept. 7 the two forces were only a few miles from each other. Surrey, by a circuitous march, placed his vanguard between the enemy and their line of retreat. The rest of the army moved on an interior line, and on the afternoon of the 9th were ascending the ridge where the Scots stood—but from the N., not from the S.

Seeing the enemy, James led his men down the ridge to meet them, and the battle was joined at once. Gradually the English gained the upper hand, and the Scots on the wings were soon in flight. On both sides the centre, picked soldiers under James and Surrey respectively, stood to fight it out. It was an unequal duel, for other bodies of English closed round the Scots, who were charged by horsemen from the rear, and when their king was killed they had definitely lost the battle.

The losses of the Scots have been placed at 11,000 out of 40,000 engaged, but both figures are too high. Certain it is that they lost heavily, especially among the nobles, who fought to the last around the king, and it is this that made the day so sad to Scottish memories. The English losses were perhaps 1,000. The best known reference in song is the description in *Marmion*. A monument marks the spot where James is supposed to have been killed.

**Flogging.** A punishment for crime. It is only applicable in English law (a) to young male offenders, by birching; (b) to

persons convicted of stealing from the person with violence; and (c) to certain male offenders under the Criminal Law Amendment Act, 1912, i.e. men who live on the immoral earnings of women or who procure girls for immoral purposes.

**Flood.** Technical name for the matrices of prepared paper used in stereotyping. See Autoplate; Multiplate; Printing; Stereotyping.

**Flood.** Submersion of land by overflow of water. After extra heavy or prolonged rainfall, or in spring and summer, when snow and ice fields melt, great quantities of surface water drain directly into rivers. The banks cannot contain all the water, which, overflowing, submerges the low-lying parts of the valley. Many parts of the world have clearly marked wet and dry seasons. In such places heavy rains during the wet season cause floods, while the same rivers during the dry season are merely dry courses containing small lakes in the deepest parts of the bed.

Egypt is aptly called "the Gift of the Nile," for in that land occurs the phenomenon of extensive floods in a land of little or no rainfall. The Nile rises in great lakes, situated in a region where rain falls at all seasons, thus ensuring a steady current of water. But tributaries like the Sobat, Blue Nile, and Atbara have their sources in regions of heavy summer rainfall, and the summer water they bring down causes floods along the lower course of the main stream. But for these flood waters Egypt would be a desert.

The character of the soil may also aid floods. Large areas of N. England and Scotland are composed of hard or impervious rocks, from which the water is rapidly drained into the rivers, so that the latter are quickly in flood during heavy rains and very low during dry weather. Where limestone or other pervious rocks are found,

rain sinks into the ground and the rivers maintain a steady flow even in dry weather.

The most disastrous floods of recent years were experienced in the basin of the Mississippi river, but especially in the basin of the Ohio, in March, 1913. See Deluge.

**Flood, HENRY** (1732-91). Irish statesman and orator. Educated at Trinity College, Dublin, and Christ Church, Oxford, he entered the Irish House of Commons in 1759 as member for Kilkenny. His closely reasoned oratory and his mastery of parliamentary tactics made him leader of the national party, and in 1775 he was made a privy councillor and vice-treasurer of Ireland. His opposition to Henry Grattan (*q.v.*) on the "simple



Henry Flood,  
Irish statesman  
After Comerford

repeal" question led to their famous quarrel, Flood urging the renunciation by England of all claims to influence Irish legislation. In 1783 Flood was returned to the British House

of Commons as one of the members for Winchester. He died Dec. 2, 1791.

**Floor.** The lower horizontal surface in the interior of a building or part of a building. A floor is constructed either in a solid mass of some material such as concrete, or of assembled pieces such as boards or blocks of wood called parquet, or by the combination of both. A double floor is one in which large principal joists, called binders, carry the actual floor joists above them, and the joists of the ceiling below. Fire-proof floors are composed of slabs of concrete, reinforced with metal rods or wires. Floors of tiles, stone, etc., used in the ground storey of a building, are generally called pavements. See Building; House.



Flora Day. Dancing, or fadding, on Furry Day through the streets and gardens of Helston, Cornwall. An ancient ceremony performed every year in the month of May

**Floorcloth.** Material used as a substitute for carpets. A preparation of indiarubber and ground cork was patented in 1844 under the name of kamptulicon, but was too dear to become popular. The principal floorcloth in use is oilcloth composed of coarse-textured canvas to which coats of oil-paint have been thickly applied. Linoleum is a preparation of ground cork and oxidised linseed oil. It was invented by F. Walton in 1860, and has had many imitations. See Linoleum; Oilcloth.

**Floors or FLEURS CASTLE.** Seat of the duke of Roxburgh. It stands on the Tweed just outside Kelso. The Kers had long had a residence here when in 1718 Sir John Vanbrugh planned a new house for the duke of Roxburgh. In the middle of the 19th century it was largely rebuilt, being made into a magnificent building in the Tudor style. It has large gardens, and commands extensive views.

**Floquet, CHARLES THOMAS** (1828-96). French statesman. Born at St. Jean-Pied-de-Port,



Charles T. Floquet,  
French statesman

Basses Pyrénées, Oct. 2, 1828, he became an advocate at Paris, and early joined the Republican party. He was active in the overthrowing of Napoleon III, and sat as deputy for the Seine dept. in the national assembly, Feb. 8, 1871. Suspected of dealings with the communists, he was imprisoned by Thiers's government, but returned to the chamber as one of the deputies for Paris, 1876.

President of the chamber 1885-88, he became president of the council, and formed a radical ministry, April 3, 1888. On July 12 General Boulanger demanded a dissolution, and his accusations of falsehood against Floquet led to their fighting a duel next day, in which both were wounded. His ministry began to lose favour after his introduction of a constitutional reform bill, Oct., 1888, and he resigned Feb. 14, 1889. Re-elected president of the chamber in Nov., 1889, he held this post until his implication in the Panama scandal, when it was shown that he had received about £11,500 from the company for the use of his party. This forced his resignation, Nov., 1892, though he made a full statement of defence at the trial of those more culpably involved, March 10, 1893. He died Jan. 18, 1896.

**Flora.** List of the species of plants growing naturally in any district or country, e.g. the flora of Wales. They are arranged according to the laws of botanical classification.

**Flora.** In Roman mythology, the goddess of flowers. She had a temple near the Circus Maximus, and a festival called Floralia was held in her honour every year from April 28 to May 1.

**Flora Day** or **FURRY DAY.** Holiday observed at Helston, Cornwall, on May 8. The custom, lately revived, may be a survival of the Roman Floralia, or may be of Celtic origin. The day is given over to revelry, any person found working being made to leap the river. Boughs of flowering hawthorn are gathered, the ancient Furry Day Song is sung, and long lines of revellers, with hands joined, "faddy"

(dance) through the streets and through the open houses. The festival attracts many visitors.

**Floralé.** Eighth month in the year as rearranged by the authors of the French Revolutionary calendar. It begins on the 20th or 21st of April, and the word means the month of flowers.

**Florence.** Prov. of north-central Italy. It lies S. of Bologna, and N. of Siena and Arezzo, midway between the Adriatic and the Ligurian seas. Area, 2,261 sq. m. The surface is hilly, and occupies part of the basin of the Arno. The soil is fertile, olives and grapes growing in profusion. Much wine is made, and silk is manufactured. Sheep are reared on the grassy uplands. The capital is Florence; other towns of importance are Pistoja, Empoli, Fiesole, and Figline. Pop. 1,028,740.

## FLORENCE: ITS HISTORY & TREASURES

Cecil Headlam, Author of *Venetia and Northern Italy*

*The city and its buildings are here described, and the history of the state that grew up around it is outlined. See Tuscany; Medici; and biographies of Savonarola, Macchiavelli, and other great Florentines; also Italy: History, Literature, Art; Guelphs and Ghibellines*

Florence, called by the Italians Firenze, lies on both banks of the Arno. The river is spanned by six



Florence arms

bridges, and lined by modern quays (Lung'arno). Broad boulevards mark the line of the old walls on the right bank. Across the river (Olt'arno), the walls and gateways begun by Arnolfo di Cambio, 1285, in succession to the smaller circuit of 1173, and still earlier Roman square, remain intact. Set in a valley among the foothills of the Apennines and the Monti di Chianti, Florence owes to the proximity of mountains and sea a variable and trying climate, to which, however, may be ascribed in part the intellectual pre-eminence of her citizens.

The site and development of the city were determined by a natural crossing point in the Arno, where, narrowed by the hill of San Giorgio and deepened by the tributary Mugnone, its navigable course begins soon after it turns W. towards Pisa and the Tyrrhenian Sea. Here, at a point indicated by the recently destroyed Mercato Vecchio, or old forum, now the Piazza Vittorio Emanuele, and the picturesque Ponte Vecchio, designed by Taddeo Gaddi in 1365, successor to a Roman bridge, the Roman road to the N. probably crossed an older Etruscan road running E. and W. Etruscan walls at Fiesole and

Etruscan antiquities in the Museo Archeologico recall the original settlers.

Roman remains include a theatre at Fiesole, and in Florence, baths (Via delle Terme), and an amphitheatre (Piazza Peruzzi). A great temple of Mars is represented in its Christianised form by the baptistery of San Giovanni (Battistero), with its superb bronze gates by Pisano and Ghiberti. The Tuscan-Romanesque churches of S. Apostoli and San Miniato mark the rise of Florence in the 11th century. They inspired the Renaissance churches of Brunelleschi, San Spirito, and San Lorenzo. The latter, near the palace of the Medici, has always been closely connected with that family. Here, besides the domed mausoleum added by Cosimo I, is the new sacristy built by Michelangelo for Pope Clement VII (1524), where that artist's wonderful statues of Day and Night, Evening and Dawn, guard the monuments of Lorenzo and Giuliano de' Medici. Here, too, is the Biblioteca Laurenziana, the priceless library of books and manuscripts collected by Cosimo and Lorenzo il Magnifico, and housed by Michelangelo.

In the 13th century Florence became a veritable forest of towers, built by turbulent nobles, as in the Borgo Santissimi Apostoli. She was now to be adorned with vast Gothic churches and splendid public buildings, such as the palace of the Podestà, the Bargello,



which enshrines the National Museum, and the Palazzo Vecchio, with its soaring tower and projecting battlements, designed (1298) by Arnolfo di Cambio, for the safe housing of the Priori. The adjoining open-vaulted Loggia dei Priori (or Lanzi) was begun in 1376. The captain of the people resided at the Badia, a Benedictine Abbey founded by the mother of Count Hugo of Tuscany, whose graceful campanile dates from 1300.

The first great period of Florentine art coincided with the establishment of democratic government. Niccolò and Giovanni Pisano in sculpture, and in painting, Cimabue, his pupil Giotto, and Andrea Orcagna led the way in the great era of artistic freedom and grace, inspired by that same passionate interest in life as Dante and Boccaccio exhibit in verse and prose. In architecture, Arnolfo di Cambio, besides the city walls and the Palazzo Vecchio, built Santa Croce for the Franciscans (1297). Here, as in the building of the Duomo, he was succeeded by Giotto and Francesco Talenti. In 1420 the great dome of this, the fourth largest church in Europe, was begun by Filippo Brunelleschi. Giotto's lovely campanile, with its four storeys of marble, was begun, 1334, and completed by Andrea Pisano and Francesco Talenti, 1387.

#### Church Architecture

S. of the Piazza del Duomo is the graceful little Loggia del Bigallo (1352), resembling in style Andrea Orcagna's more gorgeous tabernacle in that splendid sanctuary of the guilds, Or San Michele, begun in 1337. The Dominican church of Santa Maria Novella was begun in 1278. The façade is by Leo Battista Alberti, the lovely arcade by Brunelleschi, and the exquisite Spanish chapel by Fra Jacopo Tanti. The much modernised church and convent of San Marco fascinates both by the art of Fra Angelico and Fra Bartolommeo, and its memories of Savonarola. The great 14th century church of the Santissima Annunziata has also been much altered, but contains some of the finest work of Andrea del Sarto.

The story of Florentine art, as it developed through Masolino and Masaccio, Fra Angelico, Lippi, Andrea del Castagno, to Andrea Verrocchio, Sandro Botticelli, Domenico Ghirlandaio and Leonardo da Vinci, Michelangelo Buonarroti and Raphael, and a host of other great artists, including Luca and Andrea della Robbia, Vasari, Benvenuto Cellini, and Gian di Bologna, can be followed in these and other churches, as well as in the great

galleries, the Academy of Fine Art, the Uffizi Palace, government offices constructed by Vasari for the grand duke Cosimo I, and the Pitti Palace. The latter, like the Palazzo Strozzi and Palazzo Rucellai (Alberti), is a typical Renaissance palace, and was begun by Luca Pitti, the opponent of Lorenzo the Magnificent, and afterwards occupied by his successors.

**HISTORY.** Florence was founded by the Etruscans. They had first settled at Fiesole, about 700 B.C., upon a rocky height to the N., commanding the way across the neighbouring Apennines to the Adriatic coast. Tempted down to the banks of the Arno by the commercial advantages of plain and river, they were presently supplanted by the Romans, whose quadrangular castrum is described as *municipium splendidissimum* in the time of Sulla.

Saved from the Goths by the legions of Stilicho and the prayers of Zenobius, a saintly bishop whose miracles often figure in Florentine art, the inhabitants fled later for refuge to Fiesole before the Lombards, but prosperity returned to their city under Charlemagne. The great power of the margraves of Tuscany delayed the rise of the Tuscan towns; but under the protection of Matilda, countess of Tuscany, and after her death in 1115, while Papacy and Empire were fighting for her heritage, Florence developed into a powerful, independent burgher city. Members of the chief families who had administered Florence in Matilda's name, now became consuls of the commune, annually elected, two for each *sestiere*, and were advised by a senate of 100 drawn mainly from the trade guilds. They led the burgher forces in their struggle against imperial vicars and feudal nobles. For the surrounding country, called the *contado*, bristled with castles, whence barons, of Teutonic origin and adherents of the Empire, harried the pack-trains of the citizens.

#### Growth of the Commune

As the commune made herself mistress first of Fiesole (1125), and then of the *contado*, she compelled these barons to take up their residence within the city. There they joined with other citizen-nobles of aristocratic tendencies and fortified themselves in lofty towers. Against these societies of the towers, and the domination of an alien power, the burghers of the commune, a commercial democracy of Latin descent, grouped into trade guilds, strove unceasingly. This is the form which the feud betwixt

Guelph and Ghibelline took in Florence.

Her interest as a growing banking and carrying community on the trade-route from Rome naturally inclined Florence to the side of the Church, while involving her in commercial rivalry with Pisa, which barred her free communication with the sea; with Siena, the leading city between her and Rome; Pistoia, and other Ghibelline cities. For centuries she waged deadly trade wars with these rivals until she finally reduced them to subjection. The murder of one of the Buondelmonti, leaders of the democratic party, accentuated the bitterness of party faction.

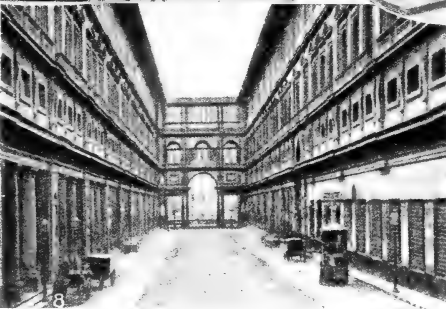
Beneath the mask of family feuds, the Florentine commune was always striving, through successive changes in the constitution, and in spite of frequent reactions, towards the completest form of democratic liberty known to the Middle Ages. The lower class of artisans and the populace had as yet no share in the government (*Signoria*), except as a parliament (*Arengo*), assembled in the city square to shout a decision upon momentous matters. But the struggle between people and patrician magnates by this time had already begun.

#### Democratic Developments

The Guelph magnates remained in power, leading the Carroccio and red and white banner (*gonfalone*) of the commune to victory against their neighbours until, in 1249, the Uberti, aided by the Emperor's German troops, thrust them into exile. On the death of Frederick II in 1250, however, the people rose and established the first democratic constitution. Twelve elders (*anziani*) and thirty-six corporals (*caporali*) were appointed as a central government. A popular militia was formed, and a foreign Guelph noble, assisted by a special and a general council, was annually elected as "captain of the people" to champion their cause against the Podestà (1250).

This officer, also an annually elected foreign noble, had replaced the consuls about 1200, and became the representative of the Ghibelline aristocrats and of imperial claims. He, too, presided over two councils; so that there were now two political organizations, that of the nobles and that of the people, within the Republic. Ten years later the exiled Ghibellines, rallying at Siena, and reinforced by the German mercenaries of Manfred of Sicily, defeated the Guelphs at Montaperti.

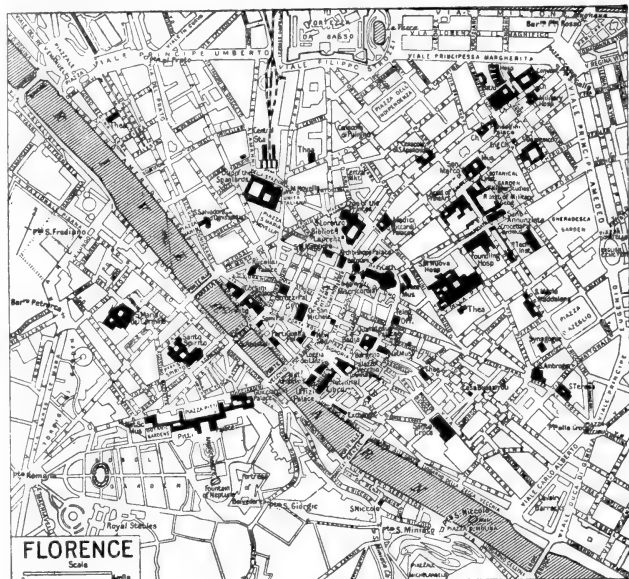
The coming of Charles of Anjou, after the battle of Benevento, put an end to the domination of Ghibelline and German (1266). The



1. Palazzo Vecchio, 1298-1314, used as the town hall since 1871. 2. View from the church of S. Spirito, showing Giotto's campanile and dome of the cathedral. 3. Church of S. Croce, begun in 1294. The new facade built 1857-63. 4. Pitti Palace, begun in 1440, containing the famous picture gallery. 5. The Baptistery, c. 1200. 6. Palazzo

Vecchio, the Renaissance courtyard built in the 16th century. 7. Cathedral of S. Maria del Fiore, crowned with Brunelleschi's dome, 1420-34. 8. Portico of the Uffizi Palace, 1560-74, containing Art Galleries and National Library. 9. Ponte Vecchio, the bridge across the Arno, built in 1345, with shops and a covered passage-way

# FLORENCE: ITALIAN CITY FAMOUS IN LITERATURE AND ART



Florence. Plan of the centre of the city, showing the principal buildings and bridges

Florentine Guelphs acknowledged Charles's suzerainty as king of Naples and Sicily. An organization (*Parte Guelfa*) was formed to persecute Ghibellines, and a new constitution (*Secondo Popolo*) similar to the first, but of a more democratic character, was set up.

In 1293 the famous ordinances of justice were enacted, intended to restrain the reviving power of the nobles, and barring them altogether from the *Signoria*. In 1300 a new officer of justice, the *Gonfaloniere*, or standard-bearer of the people, was added. Under this republic of merchants (*Villari*) the great "Trecento" era of art and literature blossomed forth.

#### Commercial Prosperity

The commercial prosperity of Florence was now great. Her merchants dealt in the wool of Latium and Lombardy, the oil and wine of Tuscany, the spices, silks, and dyes of the East; the craftsmen of the Calimala guild dressed and dyed foreign cloth into artistic fabrics, which were prized throughout Europe; while her bankers with their standard golden "florin," first coined 1252, provided the necessary medium of exchange, and extended her financial influence far and wide.

Head of the Guelphic League, Florence was now the chief power in Tuscany. At Campaldino (1289) she had shattered the remaining forces of the Tuscan Ghibellines. The Guelphs, however, soon split into factions, Neri

and Bianchi, headed by the Donati and Cerchi families. Dante, an adherent of the Bianchi, was banished when Charles of Valois, in alliance with the Neri, sacked the city, 1301. Nevertheless, the merchant republic succeeded in forming what was practically a confederation of all Italy.

The victorious Neri soon split into factions. Florence then fell a prey to the exactions of the Angevin sovereigns of Naples, and the tyranny of a French soldier of fortune, Walter de Brienne, duke of Athens. After his fall the people rose and annihilated the magnates, 1343.

#### Dawn of the Renaissance

The struggle for political power was henceforth between the rich burgher aristocracy (*Ottimati*) of the greater guilds and *popolo minuto*, the rest of the unenfranchised guilds and people, typified by a rising of the latter (*Ciompi*), led by Michele di Lando, a patriotic wool-comber. The dawn of the Renaissance found Florence full of artists and scholars patronised by the Ottimati. Fierce wars were waged with Milan and other cities by mercenaries, such as those led by the English captain Hawkwood, and the dominion of Florence was extended over Pisa (1406), Arezzo, Cortona, and Leghorn. But the divisions of the Republic finally placed it at the mercy of Cosimo, son of Giovanni de' Medici, the richest banker in Italy. Returning from exile, he took his

place as Despot of Florence (1443). The outward forms of the old constitution were retained, while Cosimo controlled the elections and broke the power of the Ottimati. At home he patronised artists (Brunelleschi, Michelozzo, Donatello, Fra Lippo Lippi, Fra Angelico), and encouraged the Neo-Platonism of the Renaissance by his Platonic Academy. He was succeeded by his son Piero (1464) and his grandson Lorenzo il Magnifico.

#### Lorenzo and Savonarola

Lorenzo maintained the balance of power among the five Italian states, and was treated as an equal by foreign potentates. At home, Florence, beautified by artists sprung from the people, became the brilliant world-centre of the revival of Greek culture. But before Lorenzo's death Fra Girolamo Savonarola, denouncing the tyranny and corruption of state and church, had prepared the way for Republican reaction. Roused by Piero II's surrender to the French invaders, the people expelled the three sons of Lorenzo. Charles VIII entered the city, Nov. 17, 1494, and took the Republic under his protection. A brief period of political and spiritual reform, inspired by the prophetic fervour of Savonarola, was followed by the excommunication and burning of the monk (May 23, 1498).

The Gonfaloniere, Piero Soderini (1502), with Niccolò Macchiavelli for secretary of state, maintained the Republic until the Medici were restored by the Spanish invaders (1512). Republicanism made one last glorious effort under Niccolò Capponi (1527). But the emperor Charles V, in alliance with Pope Clement VII, who had ruled Florence as Cardinal Giulio de' Medici, reduced the town after a siege of eleven months.

Charles appointed Alessandro, illegitimate son of Lorenzo, son of Piero II, duke of Florence. Alessandro suppressed the ancient Signoria for ever. He was murdered in the Palazzo Medici by his kinsman, Lorenzino, and was succeeded by Cosimo I de' Medici, "the Great" (1537). Allying himself with Spain and the Papacy, and making himself master of the surrounding country, while he patronised the artists of the late Renaissance, Cosimo founded a long line of grand dukes of Tuscany (1569).

Florence remained the capital of Tuscany when, in 1737, the Medici line having become extinct, the duchy was annexed by the emperor and became an appanage of the House of Austria. After the Napoleonic interludes of the republic and kingdom of

Etruria, 1801-7, Tuscany joined the growing Kingdom of Italy by a plebiscite of March, 1860, and Florence became the first capital of the United Kingdom of Italy (1865-71). See Door illus.

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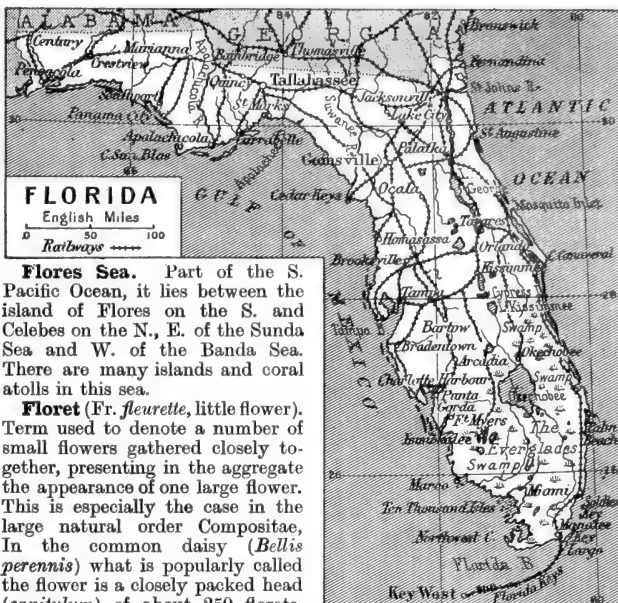
**Florence of Worcester** (d. 1118). English chronicler. A monk at Worcester, he lived in the time of William II and Henry I and died in July, 1118. His chronicle of English history begins with the Creation, is filled with stories and legends from earlier writings, and is only valuable for the period covered by the author's life. The work was continued to 1141 by John of Worcester. See Eng. trans., ed. B. Thorpe, 1848.

**Florence Station.** Hamlet of Tennessee, U.S.A., in Rutherford co. It is situated 26 m. S.E. of Nashville, and has a small export trade in grain and cotton. Near here, Dec. 31, 1862, to Jan. 2, 1863, was fought the battle of Stone River.

**Flores.** Island of the Azores, in the Atlantic Ocean. It is the most westerly of the group. The surface is mountainous, and sheep are reared on the grassy slopes. The soil is fertile, and fruit and vegetables are cultivated. The chief town is Santa Cruz. Off Flores, in 1591, took place the naval action between Sir Richard Grenville in the Revenge and several Spanish vessels. Pop. 8,250.

**Flores.** Island of the Dutch East Indies, in the Sunda group of the Malay Archipelago. A dependency of Timor, it lies S. of Celebes, from which it is separated by the Flores Sea, midway between Java and Timor. Oblong in shape, it is 230 m. from W. to E., with an average breadth from N. to S. of 28 m., and an area of 5,860 sq. m. The chief products include sandalwood, cotton, edible birds'-nests, dyewoods, tortoiseshell, and beeswax, while rubber culture is making progress. Pop. 250,000.

**Flores.** Department of S.W. Uruguay. It is bounded on the N. by Durazno and on the S. by San José. It is hilly, with good pasturage; agriculture and stock-raising are the principal industries. It is traversed by the rly. running N. from Montevideo. The capital is Trinidad. Area 1,744 sq. m. Pop. 22,079.



**Flores Sea.** Part of the S. Pacific Ocean, it lies between the island of Flores on the S. and Celebes on the N., E. of the Sunda Sea and W. of the Banda Sea. There are many islands and coral atolls in this sea.

**Floret** (Fr. *fleurlette*, little flower). Term used to denote a number of small flowers gathered closely together, presenting in the aggregate the appearance of one large flower. This is especially the case in the large natural order Compositae. In the common daisy (*Bellis perennis*) what is popularly called the flower is a closely packed head (*capitulum*) of about 250 florets, of which four-fifths are short, yellow-coloured tubes, constituting the disk. Around the disk is an outer series in which the tube has been split into a much larger white strap. These ray-florets, as they are called, contain no stamens; their principal purpose is to make the flower-head conspicuous and attract insects to effect cross-pollination. Groundsel (*Senecio vulgaris*) has all its florets without rays, while in dandelion (*Taraxacum officinale*) they are all rayed.

**Florian.** JEAN PIERRE CLARIS DE (1755-94). French author and academician. Born March 6, 1755, he obtained an appointment in the household of the duke of Pen-thièvre, and afterwards held a commission in a cavalry regiment. He was imprisoned when the Revolution broke out, and died Sept. 13, 1794, soon after his release. Author of several comedies, romances, and pastorals, he was elected to the French Academy in 1788. He is remembered chiefly for his Fables, 1792.

**Florianopolis.** New name for the capital of the state of Santa Catharina, Brazil, more commonly known as Desterro (*q.v.*).

**Florida.** State in the extreme S.E. of the U.S.A. Its area is 54,861 sq. m., excluding the water area, slightly larger than that of England and Wales. It is designated the "Peninsular State" from its shape, and the "Everglade State" on account of the large swamp or lake in the S. containing hundreds of thickly wooded islets. Of many

Florida. Map of the Everglade State of N. America

navigable rivers the Apalachicola and Suwanee are the chief, and the largest lake is the Okeechobee; around the coast are several good harbours. Pineapples, oranges, various cereals, cotton and tobacco are cultivated; phosphate rock is the chief mineral.

Manufactured products are tobacco, lumber, turpentine, tar, and resin. There are a state university at Gainesville, and a state college for women at Tallahassee. More than 4,900 m. of railroad are worked. Two senators and four representatives are returned to Congress. Tallahassee is the capital. Pop. 920,181, of whom one-third are negroes. Florida derived its name from the day in 1513 on which it was discovered by Ponce de Léon—Easter Day (Spanish, *Pascua Florida* or Feast of Flowers)—and was by turns in the possession of Spain, France, and Great Britain till 1819. The state was admitted to the union in 1845.

**Florida.** Central dept. of Uruguay. The surface consists of undulating grassy tracts, watered by the Yi river, upon which are reared vast herds of cattle. Area, 4,673 sq. m. Pop. 62,666. The capital is Florida, 70 m. by rly. N. of Montevideo.

**Florida Bay.** Arm of the Gulf of Mexico. It separates Florida state, U.S.A., from Florida Keys.

**Florida Keys.** Curved chain of reefs off the S. coast of Florida, U.S.A. They extend from Soldier Key, near Miami, in a S.W.

direction to Key West, a distance of about 140 m. These low-lying islands, principally coralline, are traversed by the Florida Coast rly. from Key West to Key Largo, where it joins with the mainland.

**Florida Straits** OR CHANNEL. Coastal waters off Florida, U.S.A., alternately known as the New Bahama Channel. They separate the S.E. extremity of Florida and the Florida Keys from Cuba and the Bahama Islands. The channel is some 300 m. long, has a mean breadth of 80 m., and a greatest depth of 6,000 ft. It is traversed by the Gulf Stream.

**Florideae** OR RHODOPHYCEAE. Class of Algae or seaweeds. In them the chlorophyll, or green colouring matter, is masked by a red pigment (phyco-erythrin). They have no true roots, but are attached to their supports by suckers, the absorbent function of roots being carried on by the surface cells of the entire plant.

**Florida.** Town of Sicily, in the prov. of Syracuse. It stands on the river Ciani,  $7\frac{1}{2}$  m. W. of Syracuse, in a fertile district producing cereals, vines, and olives, and trades in grain, wine, and oil. Pop. 12,522.

**Florin.** Name of several gold and silver coins of various European currencies. A gold coin struck

minted. It was at first dubbed the "graceless florin," as the customary D.G. (Dei Gratia) did not appear on the issues between 1849-52. The life of a florin in circulation is estimated at about 45½ years. A double florin, or four-shilling piece, was minted from 1887-90, but proved inconvenient. The Australian florin has the same value as the British, but a different design. Among modern continental florins, the Austrian florin issued in 1857, and the silver florin struck by Louis Napoleon, king of Holland, 1807, are notable, the latter becoming the Dutch gulden.

**Florina.** Town of Greece, in Macedonia, formerly in Turkey-in-Europe. It is about 15 m. S.S.E. of Monastir, and was one of the towns in the tract of territory acquired by Greece as a result of the Balkan wars, 1912-13. Pop. 10,155. It came into prominence during the Great War. Captured by the French in April, 1916, it was retaken by the Bulgarians, Aug. 20, 1916, and retaken by Franco-Russian troops, Sept. 18, 1916. See Salonica, Expedition to; Serbia, Conquest of.

**Florio, JOHN** (c. 1553-1625). Author and translator. Born in London, his father was an Italian, who, being a Protestant, had left his own country for England, where he became minister to a congregation of Italians who shared his religious opinions. The son was educated at Magdalen College, Oxford, became a teacher of French and Italian in the university, and held various offices at court, including that of tutor to Prince Henry, son of James I. In 1598 appeared his Italian-English dictionary, *A World of Words*, and in 1603 his famous translation of Montaigne's *Essays*, on which his reputation rests. He compiled two collections of proverbs, sayings, etc. Florio died of the plague at Fulham. Ben Jonson was one of his friends.

**Florist.** Cultivator or vendor of plants and flowers. The florist in large towns deals largely in exotic flowers raised under glass, and also imports flowers from milder cli-

mates. The Scilly Islands and the S. of Europe furnish many of the flowers sold by London florists. Floral Hall, in Covent Garden market, is devoted to the sale of flowers. See Flower Farming.

**Florizel.** Character in Shakespeare's *A Winter's Tale*. He is the son of Polixenes, king of Bohemia, and falls in love with Per-



Florizel, in Shakespeare's *A Winter's Tale*, watches Perdita offering flowers to her disguised enemies

From the picture by C. R. Leslie, R.A.

ditia, who, brought up by a Bohemian shepherd, is the lost daughter of Leontes, king of Sicily. The name was applied to the Prince Regent (George IV) on his amour with the actress "Perdita" (Mary) Robinson, whom he first saw playing in *A Winter's Tale*.

**Florodora.** Musical comedy written by Owen Hall (James Davis) and composed by Leslie Stuart. It was produced Nov. 11, 1899, at the Lyric Theatre, London, where it ran for 455 continuous performances.

**Florus** (2nd century A.D.). Roman historian. Nothing is known of him except that he lived during the reign of Hadrian. His work, called an *Epitome*, treats of the military history of Rome from the regal period down to the reign of Augustus. It was written in a florid and poetical style, a glorification of Rome rather than a history, and notwithstanding its inaccuracies, was much used by later historians and the chroniclers of the Middle Ages. The title of the work and the author's name are variously given. By some he is identified with Publius Annius Florus, African by birth, a poet and friend of Hadrian. Another Florus (Julius) was a friend of Horace, who addressed two epistles to him.

**Floscularia**, OR FLOWER ANIMALCULE. Group of rotifers, common in most ponds. The body is supported on a slender stalk contained in a gelatinous tube, and the wheel-disk is provided with long, bristle-like processes which



Florin. Gold coin of Edward III; above, silver florin minted in 1918

Actual diameter of Edward III florin,  $1\frac{1}{16}$  ins.; of George V florin,  $1\frac{1}{8}$  ins.

at Florence in 1252 bore. obverse, the figure of S. John Baptist, reverse, the Florentine lily, whence came the name florin (Ital. *florino*, little flower). Similar pieces appeared in various parts of Italy as a result of its wide circulation. Gold florins were also minted by Charles I of Anjou, c. 1335, and by John of Luxembourg c. 1340. The English gold florin, of approximate value six shillings, issued by Edward III in 1343, was withdrawn in 1344.

The British silver florin, value two shillings, weighs 174.55 grains. It was issued in 1849, and is still



John Florio, translator of Montaigne



serve to entangle the minute particles on which the animal feeds. It is just visible to the naked eye.

**Flotation.** When a body is placed in a fluid, an upward force acts on it, equal to the weight of fluid displaced and due to the pressure of the fluid. If the quantity of fluid displaced weighs less than the body, the latter sinks; otherwise the body floats. Thus when a solid floats, the weight of the volume of liquid displaced is exactly equal to the weight of the whole body. A balloon in the air will continue to rise till the density of the air in which it floats is such that the amount of it displaced by the balloon is equal in weight to that of the balloon and its contents. See Hydrostatics; Metacentre.

**Flotilla** (Span., small fleet). In the tactical organization of a fleet, usually a number of destroyers grouped under a commodore or a captain and intended to be worked as a whole. The senior officer is accommodated in a fast light cruiser or flotilla leader, and the flotilla itself generally consists of 20 boats representing four or five tactical units. Submarines are normally organized in flotillas, though they usually work as independent units. A number of mine-sweeping trawlers or anti-submarine drifters working together is sometimes referred to as a flotilla. See Navy.

**Flotilla Leader.** Ship between a light cruiser and a destroyer in size and intended for service as senior vessel of a destroyer flotilla. Dimensions vary, but the leaders all displace about 2,000 tons, have a speed of approximately 35 knots, and are armed with 4-in. guns and 18-in. torpedo tubes.

**Flotsam and Jetsam** (low Lat. *flottare*, to float; Lat. *jactare*, to cast). English law term. Goods found floating up on the sea are flotsam. Jetsam means goods jettisoned, cast overboard in a storm, or washed upon shore after a wreck. They become the property of the crown unless claimed by the rightful owners; hence people finding them must hand them over to the receiver of wrecks.

**Flounder** (*Pleuronectes flesus*). Small species of flatfish, common in the sea and the lower reaches of rivers. It belongs to the same

genus as the plaice, but is smaller, being seldom 12 ins. long. It has dark mottlings, and lacks the orange-coloured spots of the larger fish. The flounder is very prolific and produces from one to two million eggs. Its flesh is delicate, but its small size makes it unimportant as a food fish.

**Flour.** Term denoting especially the ground contents of the wheat berry freed from its dermal envelopes. The corresponding product of some other grains, particularly maize and rice, is called cornflour. Similar starchy meals are yielded by other cereal grasses, buckwheat, pulses, and banana; sago-palm pith, and tapioca, arrowroot, potato, and other roots and tubers.

The stone pounders used in neolithic times gave rise to handmills or querns, wherein wheat-meal was ground between two stone disks. In the early metal age the upper millstones were rotated by slave or cattle power, in classical Greece and republican Rome by geared water-wheels, later by windmills, and since 1784 by steam. As the 19th century advanced flour manufacture was revolutionised by the invention of roller-mills.

The wheat berry comprises four dermal coats, weighing 5 p.c., the germ and the embryo membrane, 5 p.c., and the kernel or endosperm, 90 p.c. It is composed of carbohydrates, 71.2 p.c., cellulose, 2.2 p.c., proteins, 11 p.c., fats, 1.7 p.c., mineral salts, 1.9 p.c., and water, 12 p.c. Of the four proteins, gliadin and glutenin, forming four-fifths of the whole, are collectively called gluten. Besides their flesh-forming value, their sticky nature confines the carbonic acid gas which yeast generates in dough within tiny cavities whose expansion causes the spongy lightness of bread.

The innermost core of the endosperm yields fine, white, weak, starch flour; that from the outer kernel is strong, granular, and glutinous. Outside this come the middlings, comprising fine sharps or seconds, and coarse sharps or thirds. The outer envelopes yield fine, coarse, and long brans. Flour is graded into patents, 50-70 p.c.; supers, 20-30 p.c.; bakers, from the lower grades, sometimes bleached; and households, the lowest of all. When all grades are mixed together straight-run flour results. Roller-milling produces about 70 p.c. of stock flour; when 10 p.c. of sharps is added the product is 80 p.c. or standard flour. Besides its use in bread-making, wheat flour is also made into

semolina, macaroni, and vermicelli. It is a thickening agent in textile printing, and the base of some violet powders.

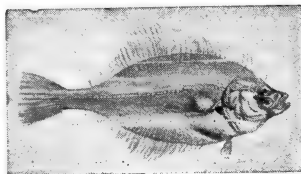
The imports of meal and flour into the United Kingdom in the year ended August 31, 1915, amounted to 3,529,573 qrs., besides 22,483,587 qrs. of wheat. Out of its 1917-18 crop Canada exported to the Allies, besides unmilled wheat, 10,000,000 barrels of flour. See Bread; Wheat; consult also Processes of Flour Manufacture, P. A. Amos, 1912.

**Flourens**, GUSTAVE (1838-71). French politician. The son of the physiologist, Marie J. P. Flourens (1794-1867), known as the associate of Cuvier, he was born in Paris, Aug. 4, 1838. He began life as a lecturer and writer, but was soon associating with revolutionaries in Italy and elsewhere. In Feb., 1870, he headed a futile rising against Napoleon III, and after the abdication of the emperor he was one of the leaders of the commune. He was killed during the fighting, April 3, 1871.

**Flour Mill.** Building equipped for grinding grain, especially wheat, into flour. The application of steam-power to millstone grinding in 1784 led, not only to improved methods of direct reduction, but also to the invention of systems for gradual reduction by means of rolls. Millstones are still used for whole wheatmeal, oatmeal, and other grains and pulses. The stones—French burrs, Derbyshire peaks, or composition disks—are usually 1 ft. thick and 4 ft. or 4½ ft. in diam., scored with straight furrows tapering to ¼ in. in depth. The upper stones rotate at a maximum of 150 r.p.m.

Although small hand-turned roller-mills were produced casually from the 16th century onwards, it was not until 1837 that Sulzberger, a Swiss engineer, founded the modern iron-roller system. Porcelain rolls, introduced in 1870, and popular for a time, are still preferred here and there. Roller mills were erected in Glasgow in 1872, and in Dublin in 1878. For some years stones and rolls were employed in the same mills. But after 1881, when an exhibition was held in Islington, British millers rapidly adopted the roller system, which to-day deals with all but a minute fraction of the merchant flour-milling of the world. During the Great War a large Chinese roller-mill was erected at Wusih, near Soochow.

Roller-mills are equipped with silos or granaries, containing capacious storage bins. These originated in N. America, where they are



Flounder, a small flatfish found round the coasts of the British Isles

called elevators. They are fed in bulk through wall hoppers direct from truck or ship's hold by conveyor bands or pneumatic suction. At this stage or afterwards, dry cleaning is effected by means of warehouse separators. These are systems of sieves utilising differences of size, and of air currents operating upon differences of weight, some screen surfaces being magnetised for extracting nails and the like. Cockle and barley cylinders are furnished with depressions and apertures for catching smaller and rejecting longer seeds respectively. Scourers fitted with rotating beaters and polishing brushes were formerly used before storage, but this purification is now often deferred until reduction is actually in progress. Wet cleaning is needed by some descriptions; some require condensation by heat.

Breaking is effected in four or five 4-roller mills, rotating at differential speeds. The chilled iron rolls, preferably set diagonally, are furnished with saw-tooth grooving, ranging from 10 to 26 per inch. The rolls may be 8 ins. to 10 ins. in diam., and 15 ins. to 60 ins. long, the speed of the longest fast or cutting rolls being 350 r.p.m. The berry being sheared open, the kernel is broken up into angular particles graded into semolina, middlings, and dust. Various appliances blend different kinds of grain, and extract light offal or bran and dust; smooth rolls crack the granules and flatten the germ; and the floury stock is then dressed and sacked. Plansifters are horizontal sieves which replace or eliminate some of the older methods. The whole process, from the crude berry to the sack of finished flour, is automatic throughout. *See Milling*; consult also *Processes of Flour Manufacture*, P. A. Amos, 1912; *Wheat and its Products*, A. Millar, 1916; *Flour Milling*, P. A. Kosmin, trans. M. Falkner and T. Fjelstrup, 1917.

**Flow.** Term used in metallurgy. Metals are usually considered as typical of rigidity and hardness; nevertheless they can all be made to flow while in the solid state. Thus a block of malleable iron or copper may be hammered out into a thin sheet. Other examples of the "flowing" of a metal are provided by the drawing and rolling of a billet into a bar or plate, and by the drawing of a tube or wire.

These operations are usually made on metals while at temperatures raised more or less above the normal, but the temperature is always much below that of fusion. Every instance of the forging of a

metal object is one of flow, but metals may be made to flow while solid and cold in a still more striking fashion. All that is necessary is to provide sufficient pressure and to give time. Solid lead may be readily made to flow through a hole as a solid pencil; while harder metals will behave in a similar fashion under suitable conditions. *See Metallurgy*.

**Flower** (Lat. *flos*; stem, *flor-*, flower). Part of a plant containing the organs of reproduction. In the complete flower it consists of four distinct whorls of organs, which differ in form and number in different species; in some cases one or more of the sets of organs being absent. The lower or outer set are the calyx-leaves, which form the bud of the unopened flower; separately they are known as sepals, and are usually green. The second series are corolla-leaves, mostly brightly coloured, separately known as petals. The third series are stamens, consisting of a stalk or filament and the anther, the latter containing pollen—the male element. The fourth series is the pistil, which consists of the ovary, containing ovules or seed-eggs, surmounted by a stigma or stigmas which may be supported by stalks or styles. Grains of pollen caught by the sticky or rough surface of the stigma send out shoots which penetrate the style and fertilise the ovules, which then develop into fertile seeds.

Sometimes the sepals are all joined together and can only be spoken of as the calyx. Similarly, the petals may be united to form a tube, and be funnel-shaped, bell-shaped, urn-shaped, etc. Where there is no distinction between sepals and petals (as in the *Crocus* and *Daffodil*) the floral envelope is termed the perianth. In the *Gymnosperms* (Conifers) there are neither sepals nor petals; and in other forest trees these organs are often very small and inconspicuous, because the pollen is carried by the wind. As a general rule, where the petals are brightly coloured the pollinating agents are insects—mainly bees, butterflies, and moths. All flowers of special shapes have been thus adapted to fit particular insects or groups of insects.

In the majority of such specialised flowers nectar-producing glands are so placed as to make certain the transfer of pollen from one flower to the stigma of another by insect agency. So also the streaks, or lines of dots, of a second colour on the petals point to the position of the nectar. The long tubes of certain flowers (tobacco, convolvulus, etc.) are related to the long

probosces of the larger moths and butterflies; broad, open flowers like buttercups to beetles, etc. The perfume emanating from flowers attracts insects—bees, butterflies, and moths. On the other hand, some flowers, such as those of the stapelias, arum family, etc., emit fetid odours attractive only to flies, which are their pollinating agents.

Edward Step

**Flower Farming.** Branch of market gardening. It includes growing flowering plants for the sake of marketing their cut blooms, and raising annual and perennial plants in vast quantities for bedding out purposes, or in pots for decorative uses. The daffodil fields of the Scilly Isles, and the gardens under glass of Worthing, Swanley, Mitcham, and various districts in the North of London, are variations.

Flower farming is carried on by the mixed system, where the flowers are grown indiscriminately between standard and bush trees; the distinct method, where separate plots are allotted to vegetables, fruit, and flowers; or the alternate system, where all crops are grown in rotation. The last is found to have the fewest defects, and the ordinary methods of cultivation are applicable.

#### Markets and Prices

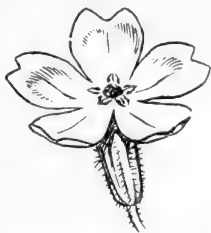
The most profitable and popular subjects for market are forced daffodils, hyacinths, and tulips in pots; cut violets, roses, lilies, white flowers of all sorts for wedding and funeral purposes; chrysanthemums, and all fine foliage plants. Blossoms of good bright simple colours find a readier market than those of fancy or bizarre hue. Flowers for marketing should be cut when only half expanded, put in water, and kept in a cool, dark place until they can be packed. They should be gathered for preference early in the morning of the day upon which they are to travel, and with stems as long as possible, although cutting into the hard wood of the parent plant should be carefully avoided. Flowers are consigned to market salesmen for disposal on commission. The rate varies from 5 to 10 p.c., 7½ p.c. being a fair and usual basis of remuneration.

The board of agriculture issues a weekly return of prices prevailing in the nine big markets in the British Isles: Birmingham, Bristol, Evesham, Glasgow, Leeds, Liverpool, London, Manchester, Wolverhampton.

The contents of all boxes of flowers should face towards the top, as the flowers are usually sold direct in the box as they arrive at the market, or at the place of retail sale.



Regular: wild rose



Salver-shaped: primrose



Rotate or wheel-shaped: periwinkle



Campanulate or bell-shaped: harebell



Funnel-shaped: bindweed



Trumpet-shaped: honeysuckle



Labiate or two-lipped: dead-nettle



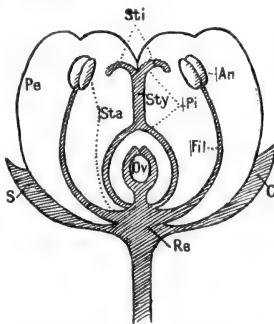
Apetalous or without petals: ash



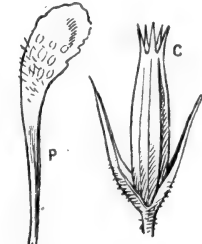
Personate or masked: snap-dragon



Papilionaceous or butterfly-shaped: sweet pea



Diagrammatic section of flower.  
An., anther; Fil., filament; Ov., ovary; Pe., petals; Pi., pistil; Re., receptacle; S. and C., sepals (calyx); Sta., stamen; Sti., stigma; Sty., style



Flower of pink. P., petal; C., calyx, showing economy of hidden parts



Trumpet-shaped: daffodil.  
C., corona; S., spathe



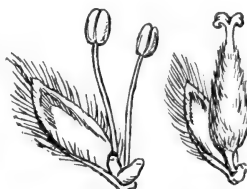
Section of composite flower with florets crowded on disk; F., floret



Superior ovary: primrose



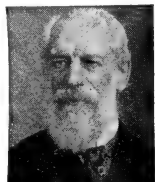
Inferior ovary: apple



Dioecious or unisexual: willow; left, male; right, female

**FLOWER: DIAGRAMS OF THE STRUCTURES OF FLOWERS AND THEIR PRINCIPAL PARTS**

**Flower.** SIR WILLIAM HENRY (1831-99). British zoologist. Born at Stratford-on-Avon, Nov. 30,



Sir W. H. Flower,  
British zoologist  
Elliott & Fry

1831, and educated for the medical profession, he served as a surgeon in the Crimean War, and became curator of the museum of the Royal College of Surgeons in 1861. He was appointed director of the natural history department of the British Museum at South Kensington, in 1884, which position he held till retirement at the age limit. He was the author of various books on anatomy, zoology, and other natural history subjects. He died in London, July 1, 1899.

**Flowering Rush** (*Butomus umbellatus*). Perennial marsh herb of the natural order Alismaceae. A native of Europe and Asia, it has a stout, creeping rootstock, from which the slender leaves rise erectly to a height of 3 ft. or 4 ft. The tall flower-scape is leafless, and bears at its summit an umbel of many rose-red flowers, each 1 in. across, of which only a few open at one time.

**Flower of Jove** (*Lychnis flos-jovis*). Perennial herb of the natural order Caryophyllaceae. A native of Europe, it is covered with white, silky hairs, and has lance-shaped, stem-clasping leaves in pairs. Each branch of the stems ends in a small cluster of purple or scarlet flowers of the campion type. See Campion.



Flower of Jove. Leaves and flower spray with, right, detached flower

**Flower-Pot.** Common garden utensil of potter's clay, usually manufactured unglazed for porosity. The top surface of the accompanying saucer should, however, always be glazed in order to retain the water which reaches it through the medium of the soil in the pot

and conserve moisture. The outside of pots should be scrubbed at intervals, and thoroughly washed out when the contents are knocked out and the utensils are to be used for other purposes. See Gardening.

**Flowers.** LANGUAGE OF. Custom said to derive from the East, by which a particular sentiment is attributed to every flower, so that a bloom or posy may convey a message. Little volumes in which the language of flowers was set out were popular in England in the mid-part of the 19th century. Gorse, for example, indicates enduring affection; jonquil, reciprocated affection; eglantine, I wound to heal, etc.



Flowering Rush. Foliage, buds, and flowers of *Butomus umbellatus*

**Flower Show.** Horticultural exhibition, held for the purpose of encouraging the cultivation of flowers, fruit, and vegetables. Local shows to stimulate interest in cottage gardens and allotments are held in many parts of the United Kingdom. The judges should be three in number, a local amateur, a professional gardener, both non-competitive, and a stranger. The Royal Horticultural Society will often send down a competent, impartial judge.

Rules governing shows vary much under differing local conditions, but it is necessary to insist upon a written guarantee that all exhibits are the absolute property of the competitor, and have been grown by him for a period of not less than six consecutive months immediately preceding the date of the show. This stipulation should be embodied in a printed list of simple rules as to date of entry, number of classes, etc., which every entrant is requested to sign.

Good judges of flowers will look out for a combination of good colour, size, form, and, where it exists, perfume.

Fruit is judged by size, colour, flavour, and shape. Vegetables must necessarily be judged entirely by appearance, and must

be smooth, straight, well coloured, and of even size. Good judges will ignore root crops that are crooked or tap-rooted, no matter how large they are. Crooked cucumbers will not win prizes, neither will stringy beans, even if of great length, soft or loose-hearted cabbages and lettuces, deep-dyed potatoes, or spongy radishes. Root crops and celery are often injured for the show table by being scrubbed and scratched by a hard brush to get the dirt off, instead of being washed with a cloth.

All flower show schedules should state whether flowers are to be staged with foliage, or bare. The same remark applies to dressing vegetables with parsley. The most important flower show in the kingdom is the annual exhibition in May by the Royal Horticultural Society, in the grounds of the Royal Hospital at Chelsea. It was formerly known as the Temple show, because it was held in the Temple Gardens, London.

**F.L.S.** Abbrev. for Fellow of the Linnaean Society.

**Fludd** or FLUD, ROBERT (1574-1637). English physician and mystic. Born at Milgate House, Bearsted, Kent, son of Sir Thomas Fludd, he was educated at S. John's College, Oxford, and took his degree of M.D. at Christ Church. He studied chemistry abroad, where he became acquainted with the writings, and adopted many of the views, of Paracelsus (*q.v.*). Returning to England in 1605, he became a fellow of the College of Physicians.

Known as "the Searcher," under the name of Robertus de Fluctibus he wrote many works in Latin, engaged in controversy with Gassendi, Kepler, and Merenne, and is believed by some to be the inventor of the barometer. As the supposed author of the *Summum Bonum*, 1629, and an apology for Rosicrucianism, 1617, he is credited by De Quincey with being "the immediate father of Freemasonry." He founded a philosophy on the Hebrew scriptures. He died in London, Sept. 8, 1637. See Freemasonry; Rosicrucians; consult also Athen. Oxon., A. Wood, 1691-92; Works, De Quincey, vol. xiii, p. 421, 1890; Robert Fludd, Life and Writings, J. B. Craven, 1902.

**Flüela.** Mt. pass of Switzerland, in the canton of Grisons. It extends between the Schwarzhorn and the Weisshorn, on the carriage road from Davos to Sus. On the latter mt., at an alt. of 7,835 ft., is the Flüela hospice. The road has refuge galleries, used for shelter in winter.

**Flüelen.** Village of Switzerland, in the canton of Uri. It stands at the head of Lake Uri, a S.E. extension of Lake Lucerne, 2 m. N.N.W. of Altdorf on the St. Gothard Rly. The port for Altdorf, it is the terminus for lake steamers. The Axenstrasse carriage road, constructed in 1863-65, leads from here to Brunnen. The village has a château and several hotels. Pop. 1,010.

**Fluellen.** Character in Shakespeare's Henry V, a Welsh officer in the king's army. Of hasty temper and verbose speech, he is ever ready to compare the fighting of his day with that of the ancients.

**Flügel Horn.** Brass instrument. It is similar to the cornet, but of wider bore, like the bugle, and of mellow, horn-like tone. It is a modern improvement of the key bugle. The soprano instrument is the most usual. The term means wing horn. See Cornet.

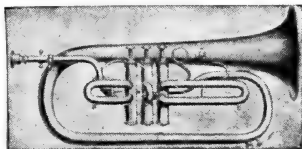
**Fluid.** That form of matter which is unable to resist permanently any shear stress, however small. Matter is solid, liquid or gaseous. Fluids are liquids or gases and they are distinguished from solids in that they owe their shape at any particular time to a containing vessel or restraining forces. The line of demarcation between a solid and a liquid is one which cannot easily be drawn. Many solids flow like liquids, e.g. a glacier down a mountain side, though at a considerably slower rate, while even solids like lead can be made to flow under the action of suitable forces. See Flow; Hydrodynamics; Hydrostatics; Gas; Liquid.

**Fluid Measures.** Nearly all fluid measures have been derived from corresponding measures of length or weight and suffer all the variations of the latter which were taken from parts of the human body. It is only within comparatively recent times that fluid measures have become standardised by law in different countries. In the United Kingdom the gallon is the unit measure for fluids, and in countries where the metric system is standardised the litre is the unit. A gallon contains a little over four and a half litres. See Weights and Measures.

**Fluke.** Group of trematode worms of parasitic nature, usually leaf-shaped. One, the liver fluke (*Fasciola hepatica*), in its adult condition lives in and devours the liver of the sheep, causing the much-dreaded "rot." The eggs pass out of the body of the sheep with the dung, and if they fall in a wet place hatch out into tiny ciliated embryos that swim about in search of a small water snail

(*Limnaea truncatula*), perishing in about eight hours if unsuccessful. Within the body of such a snail other stages of life are passed, until finally one shaped like a minute tadpole is attained (*cercaria*). This leaves the snail and swims to a stem or leaf of grass, to which it attaches itself, and passes into an encysted or dormant stage. Its tail has gone, it is covered by a limy coat, and resembles the adult fluke except in size.

Should a sheep swallow one of these capsules or *cysts*, the limy covering is dissolved by the gastric juice, and when it passes into the small intestine the tiny fluke makes its way up the bile-duct into the liver of its victim, there to increase in size and become sexually mature. The disease may be entirely prevented by keeping sheep



Flügel Horn. Improved model of B flat horn

By courtesy of Hawkes & Son

away from damp, ill-drained land. As there is no cure for the disease, sheep showing signs of rot should be slaughtered as soon as possible. See Sheep.

**Fluoranthene** or IDRYL ( $C_{15}H_{10}$ ). Substance found in coal-tar and in the residue known as "stuppfeet" obtained after the distillation of mercury ores. Crude pyrene from coal-tar is converted into the picric acid compound, whence the fluoranthene is obtained in the free state and recrystallised.

**Fluorescence.** Absorption of light of certain colour or wave-length, and radiation or emission of light of other wave-lengths by certain bodies. A solution of the green colouring matter of plants, chlorophyll, placed in a dark room where a beam of white light reaches it, becomes luminous and emits a red light from the portions of the liquid on which the white light falls. Paraffin oil, solutions of quinine, of some of the coal-tar dyes such as the red-ink eosine, and of salts, such as barium or potassium platino-cyanide, act similarly. Beams of coloured light do not always excite fluorescence.

For example, although red, yellow or green fail, blue or violet light will at once provoke in a solution of quinine the characteristic pale blue fluorescence. The solution of chlorophyll, on the other hand, retains its red fluorescence when exposed to most

kinds of light, though in violet light the glow becomes brownish. The light emitted by a fluorescent body is found spectroscopically not to be light of one colour or of one wave-length only, but to comprise light of various colours, with a wave-length always greater than the wave-length of the light which causes the fluorescence. Thus when a beam of sunlight passes through a solution of quinine, it is deprived of its invisible ultra-violet rays, which the quinine converts into blue and violet rays of longer wave length, visible to the eye.

The emission of the fluorescence stops as soon as the light which causes it is cut off. But some substances, particularly the sulphides of barium, calcium and strontium, continue to emit light after the exciting cause has been cut off. Thus, after exposure, they glow in the dark. This glow is called phosphorescence, although the glow of phosphorus itself is not due to these causes, but to slow chemical action. See Phosphorescence.

**Fluorescein.** An aniline dye formed by heating five parts of phthalic anhydride with seven parts of resorcin at a temperature of 200° C. in an enamelled cast-iron pot. When the reaction has taken place the mass becomes solid and forms a dark-brown cake. The solution in alcohol or alkalis exhibits a brilliant yellow-green fluorescence from which the substance takes its name. It is used for dyeing silk and also for preparing the liquid in druggists' show bottles.

**Fluorine.** Gaseous element of greenish-yellow colour, first isolated by Moissan in 1886. Its chemical symbol is F. Derbyshire-spar or "blue-john" is calcium fluoride. Cryolite, a double fluoride of aluminium and sodium, is found in Greenland, and the element occurs widely throughout the mineral kingdom, but only in small amounts. Scheele in 1771 first recognized that fluorspar is a fluoride of calcium and prepared hydrofluoric acid, but all attempts to prepare fluorine were unsuccessful before 1886. It was liquefied in 1897 and solidified in 1903.

The difficulties in preparing fluorine are very great on account of the extremely active chemical affinity it has for glass and most metals. Traces of the gas are very irritating to the mucous membrane, and if brought into contact with the skin the gas causes a bad burn. Alcohol, ether, benzene and turpentine take fire on contact with fluorine. Moissan isolated the element by the electrolysis of anhydrous hydrofluoric acid to which acid potassium fluoride had



been added in order to make the liquid conduct the electric current. One compound of fluorine and hydrogen is known, but no oxide has been prepared. Although fluorine is akin to chlorine in many properties, there are no fluorine compounds corresponding to hypochlorites and chlorates.

**Fluorides.** Salts of hydrofluoric acid. They are prepared by acting on a metal, or its oxide hydroxide or carbonate, with hydrofluoric acid. Calcium fluoride ( $\text{CaF}_2$ ) occurs native as fluor spar or "blue-john," and from it most of the preparations of fluorine are made. The fluorides of the alkalis are soluble in water and are employed with mineral acids or acetic acid in the processes of etching glass. Some of the fluorides are gaseous at ordinary temperatures, but most of them are stable bodies, and are not decomposed by heat. A series of double fluorides is known. Fluorides are recognized by the evolution of hydrofluoric acid on heating with sulphuric acid.

**Fluorspar.** Common mineral widely distributed in rock crevices. It is a compound of calcium and fluorine and is used as a source of hydrofluoric acid and as a metallurgical flux. When colourless and transparent it is used for lenses; amethyst, purple, green, or yellow specimens yield "false" amethysts, sapphires, etc., for cheap jewelry. Derbyshire "blue-john" is made into ornamental vases. The mineral is also found in Cornwall and Cumberland. In 1920 a new field for the supply of fluorspar was found near Wirksworth, Derbyshire.

**Flushing** (Dutch, *Vlissingen*). Seaport of Holland. On the S. coast

of the island of Walcheren, it lies at the mouth of the Schelde, in the province of Zeeland. It is now chiefly noted as the port for communication with the ports of Queenborough and Folkestone, Kent (S.E. & C. Rly.), with through rly. connexion to Rotterdam, Amsterdam, and the N. of Europe generally. Except for shipbuilding and some rly. workshops, the town has little trade, but it is of considerable strategic importance, and new fortifications are planned. It had also developed before the Great War as a sea-bathing resort.

In the history of the Netherlands Flushing was often prominent, especially as a naval base. It was the birthplace of Admiral Ruyter, 1607, and there is a monument to him in the town. The town was severely bombarded by an English fleet under Lord Chatham in the Walcheren expedition of 1809, but the subsequent attempt to capture Antwerp from there failed completely. Pop. 21,878.

**Flushing.** Suburb of the borough of Queens, New York, U.S.A. Formerly a village of Queens co., it stands on Flushing Creek. Long Island, and was incor-

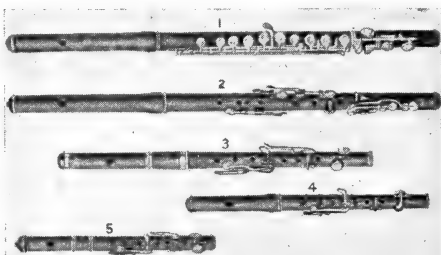
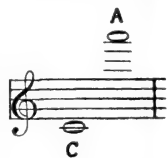
row of tentacles which can be protruded from the cell in search of food.

**Flute** (Lat. *flatus*, blast). Family name of many wind instruments of the whistle type, whether blown vertically through a mouthpiece or transversely through a side hole.

Down to the end of the 18th century the number of flutes employed in the orchestra was uncertain, and on account of their weak tone several of them were often used in unison; but the modern instruments are so much improved that it is now customary to employ them singly, and the two (or occasionally three) flutes of the modern orchestra play independent parts. Flutes have been made at various pitches, but the scale of the open finger-holes is always called D. The transposing of flutes, other than the concert flute of ordinary pitch, has been usually reckoned from D instead of from C. Originally, the six finger-holes were the only means of obtaining a scale, and chromatic notes had to be made by cross-fingerings, half stops, and other unsatisfactory means; but key after key has been added until now all the semitones are producible, in good tune and with even tone. The convenient compass of the concert flute is as shown, and three semitones higher are possible. The flute is the most agile of the wind instruments, modern mechanism having reduced finger difficulties to a minimum. Flute is also the name of an organ stop imitating the tone of the orchestral instrument of the same name. See Fife; Flageolet; Organ; Recorder; consult also History of the Boehm Flute, 1896; Six Lectures on the Recorder, C. Welch, 1911.

**Flûte-à-bec.** Beaked flute, or flute with a mouthpiece, played vertically. See Flageolet; Flauto Traverso; Recorder.

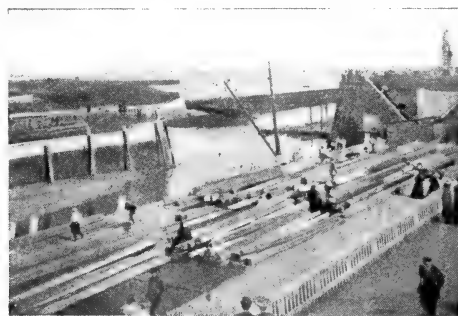
**Fluting.** In architecture, the grooves in a column, separated by fillets. The elliptical channels in Doric columns are, however, not called flutes. Fluting is generally vertical, but spiral fluting occurs in Norman architecture. See Architecture.



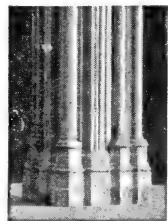
Flute. 1. Boehm concert flute, 26 ins. 2. 8-keyed concert flute, 26 ins., 17th-19th centuries. 3. Military flute in F, 19 1/2 ins. 4. Military fife in B flat, 15 ins. 5. Piccolo or octave flute, 12 ins.

porated with the borough in 1908. It contains schools and a public library, and manufactures chemicals and cinematograph films. Settled in 1643, it later became the residence of many Quaker families.

**Flustra.** Group of polyzoa. Usually known as sea-mats, they resemble small brown seaweeds. They are common around the British coasts, and consist of a horny, leaf-like skeleton, containing vast numbers of tiny cells. Each of these is occupied by a tiny flower-like polyp with a



Flushing, Holland. General view of the quays and port



Fluting of column in Canterbury Cathedral

**Flux.** Term used in metallurgy. Comparatively few metals present themselves in nature in the metallic form, or native, to use the metallurgical term; most are combined with other elements, the combination forming an ore. These ores are often difficult to melt, and are smelted by the aid of fluxes.

The chief fluxes are lime or limestone, common salt, sodium carbonate, clay, silica, borax litharge, nitre, carbon, argol or bitartrate of potash, flour, starch, and potassium cyanide, while argol and nitre are used in combination to form "black" and "white" fluxes. See Metallurgy; Smelting.

**Fluxion.** Term used by Sir Isaac Newton to signify the rate or proportion at which a variable (or flowing) quantity increased its magnitude. The fluxion is now usually regarded as the differential. See Differential Calculus; Newton.

**Fly.** Insect of the order known as Diptera from being characterized by the possession of only

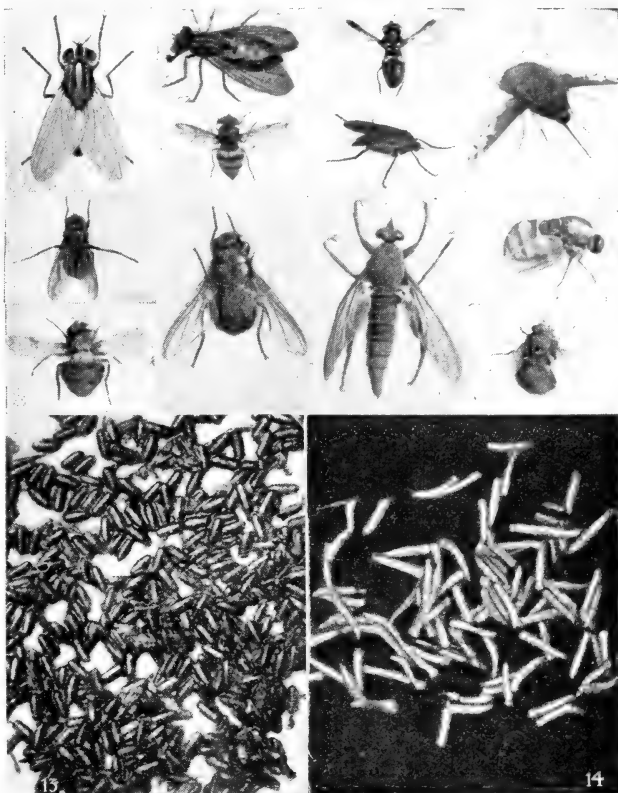


Fly. Foot of house-fly highly magnified

two wings. The fore wings alone remain as flying organs, the hind ones having become reduced to two small balancers resembling drumsticks and known as *halteres*, upon which depends the insect's power of balancing itself in the air; if they are removed, the flight at once becomes unsteady.

The wings are without scales and usually hairless, but strongly veined. The buzzing sound is produced by the rapid vibration of the wings in flight, which often amounts to 600 beats in a second. The jaws have been modified to form piercing or sucking instruments or both, and the insect feeds entirely on fluids. In the biting species, as gnats and horse-flies, the mouth is provided with a pair of sharp lancets contained in the proboscis. The feet of many flies have pads covered with minute sucker-like hairs, with which they can walk upside down or ascend the glass of window-panes.

Flies pass through a complete series of metamorphoses. The eggs are usually deposited in situations where the young may find a supply of food ready to hand, and the larvae are in many cases small white maggots without apparent head, as those of the house-fly and the blue-bottle. In other species, as the gnats, they are aquatic and are



Fly. 1 and 2. House fly, *Musca domestica*. 3. Girdled drone fly, *Volucella inanis*. 4. Gold-girdled fly, *Chrysotoxum bicinctum*. 5. Dung fly, *Scatophaga stercoraria*. 6. Humble-bee fly, *Bombylius major*. 7. Bacon fly, *Policetes lardarius*. 8. Humble-bee's drone fly, *Volucella bombylans*. 9. Noctuid fly, *Mesembrina meridiana*. 10. Hornet fly, *Asilus crabroniformis*. 11. Hump-backed fly, *Ogcodes gibbosus*. 12. Great Bristly fly, *Tachina grossa*. 13. Pupae and, 14, maggots of house-fly

1, Nat. Hist. Mus., S. Kensington; 13 and 14, Pub. Health Dept., Liverpool

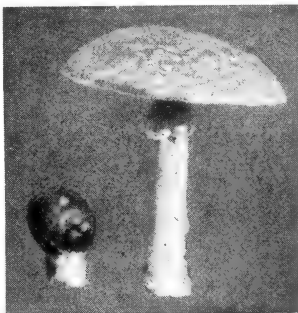
variously modified to suit their mode of life. In a few species the larvae are parasitic and live in the bodies of their hosts. See Insect; also Bot-fly, *illu*.

**Fly.** Word used for a hackney cab, presumably on account of the fact that its speed, when intro-

duced, was, comparatively speaking, considerable. The space above the proscenium in a theatre, from which the scenes, etc., are controlled, is called the flies. See Cab; Theatre.

**Fly.** Largest known river of New Guinea or Papua. It rises among the Victor Emmanuel Mts. in the E. part of the island, and flows S.W. and then S.E. to discharge its waters into the Gulf of Papua by a long, wide estuary. For part of its course it forms the frontier between Dutch and British New Guinea. It has a length of about 620 m., and is navigable for small craft for nearly the whole of its course. The principal affluents are the Alice and Strickland rivers.

**Fly-agaric** (*Amanita muscaria*). Large toadstool of the family Agaricinae. It has a creamy-white stem and gills, the former with a broad soft frill around its upper



Fly-agaric, the large toadstool. *Amanita muscaria*

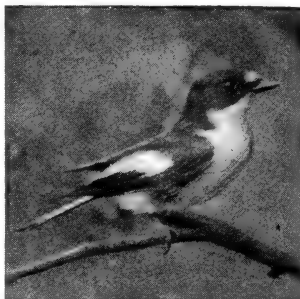
part. The upper side of the cap is orange-scarlet, flecked with irregular particles of white—the remains of an outer envelope. Well known as a poisonous species, it was formerly employed for poisoning fly-papers. It has also intoxicating properties, and is used in Kamchatka in preparing vodka.

**Fly Catcher** (*Muscicapa*). Small bird of a family including nearly 300 species. All feed upon insects, which they usually catch on the wing. The tail is in most species considerably shorter than the wing, and while the European species are plainly clad in sombre hues, some of the tropical ones are extremely gorgeous. The pied fly catcher (*M. atricapilla*) comes to Great Britain in the spring, the spotted fly catcher (*M. grisola*) late in summer, and the red-breasted fly catcher (*M. parva*) is occasionally seen in autumn. See Egg, colour plate.

**Fly Fishing.** Fishing with an artificial fly. The flies are made of feathers, silk, tinsel, fur, and other materials. Trout-flies, especially those used in the dry-fly method, are made to resemble as closely as possible some form of fly or other aquatic insect.

The fly, which is attached to the line by a cast of gut of a thickness varying with the shyness of the fish, the colour of the water, and other conditions, may be either sunk deeply in the water, or fished wet near the surface, or floating. The opinions of experts differ about the value of colour in artificial flies, as compared with their size and form, but all agree that the principal factor in success is the way in which the fly is presented to the view of the fish. Recent experiments in underwater photography have done much to confirm the view that, when fished "dry" or floating, the important factor in an attractive fly is its silhouette as seen against the light.

It is essential in fly fishing for the angler to keep himself and his rod out of sight of the fish, and this condition is usually ensured by keeping low when fishing up or across a stream, and by using a long line when fishing down stream or casting over a loch. Correct casting requires skill which can be attained only by practice. Where the surroundings permit, the rod can be kept up and the cast made overhead; it can also be made underhand, or the line can be got out by the Spey throw or other such methods, such as the downward cut employed against the wind. The best sport to fishermen with the fly in the United Kingdom is given by salmon, sea-trout, and



Fly Catcher. The pied fly catcher, a spring visitor to Great Britain

brown trout of different species, and grayling.

Fly fishing with natural flies is another method, but, owing to the difficulty of keeping them on the hook when casting, the method of dapping is employed. The fly is dropped on the water and raised again with a short line, or a long rod is used with a light blow-line, taken out by the wind. See Angling.

**Flygare-Carlén, EMILIE SMITH** (1807-92). Swedish novelist. Born at Stroemstad, Aug. 8, 1807, in 1827 she married Axel Flygare, and was left a widow in 1833. She published her first novel, Vladimir Klein, in 1838, under the pseudonym "Fru F." In 1841 she married John Gabriel Carlén, lawyer and man of letters, and continued to write many stories, largely concerned with the life of the Norwegian coast. She died at Stockholm, Feb. 5, 1892. Many of her novels have been translated into English, including *The Rose of Tistelön*, 1844; *The Birthright*, 1851; *The Guardian*, 1865. Her collected novels were published in 31 vols., 1869-75. See her Reminiscences, 1878.

**Flying Boat.** Aeroplane the body of which is of boat formation. The flying boat is exactly what its name implies. In the hull of the boat space is provided for passengers, pilot, petrol supply, and cargo. The engine is usually placed between the wings, which are attached directly to the boat. The boat itself is capable of being anchored out in harbour in exactly the same way as the ordinary boat, and it can, if necessary, move under its own power on the water without rising. Flying boats are among the heaviest types of aircraft. The N.C. 4 type, for example, which flew the Atlantic in 1919, weighed over 11 tons in flight.

During the Great War flying boats, especially the A.D. flying boat and the large Felixstowe boats built by Commander J. C. Porte, were employed extensively on patrol work and submarine spot-

ting. Flying boats are invaluable for all coastal work, while for cross ocean transport, types have been constructed to alight with equal facility on either land or water. See Seaplane.

**Flying Buttress.** In architecture, a half arch used to transmit the thrust or pressure of a structure, usually a vault, to a main buttress or solid foundation. Flying buttresses were first used in France in the 12th century, and formed a principal decoration of the exterior of French cathedrals. There are fine examples at Westminster Abbey. See Buttress.

**Flying Column.** Body of lightly equipped, self-supporting troops which operates for short periods at a distance from its base. Such bodies are necessary when regular armies are engaged in putting down guerrillas. The term has also been applied to large forces like those of Sir Donald Stewart and Sir Frederick (later Earl) Roberts, which during the Afghan War of 1878 abandoned their communications in order to march to the relief of a beleaguered garrison.

**Flying Corps, ROYAL.** Former branch of the British army. Early military aviation in the British



Flying Corps badge

army was in the hands of the balloon section of the Royal Engineers, a branch formed when the value of observation balloons was first recognized.

It subsequently controlled the service airships and, later, aeroplanes, but little encouragement was offered officially. In 1912 the Royal Flying Corps was formed, being mainly constituted of officers convinced of the value of the new arm who had become pilots privately at their own expense. It incorporated a Naval Wing, though this was controlled from the air department at the admiralty and became independent in 1914 as the R.N.A.S.

The R.F.C. was much handicapped by inefficient equipment and lack of official foresight, and at the outbreak of the Great War had a total personnel of approximately 2,000 and only 82 aeroplanes in fit condition to send overseas. Indomitable courage and individuality enabled many difficulties to be overcome, and the services rendered in the early stages of the war were invaluable, but the equipment was never superior to that of the enemy until the De Havilland and F.E. machines were introduced to counteract the

German Fokkers. The corps was greatly expanded until April, 1918, when it was merged into the Royal Air Force, the officers being granted the option of remaining in the army. The badge of the corps was R.F.C. as a monogram within a wreath surmounted by a crown. See Air Force, Royal.

**Flying Dutchman.** THE. Spectral ship traditionally haunting various seas. It is generally associated with the latitude of the Cape of Good Hope, about which it was said to be ever moving under crowded canvas, unable to reach port. The vessel was supposed to be thus doomed owing to the abominable acts of her crew headed by their captain, Vanderdecken. Her appearance is deemed a portent of disaster. The legend was dramatised in *The Flying Dutchman* by Douglas Jerrold, 1829, and later by Edward Fitzball; Captain Marryat founded his story, *The Phantom Ship*, on it, 1839; and it inspired Richard Wagner's opera, *The Flying Dutchman*, 1844.

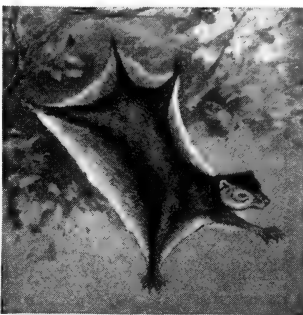
**Flying Fish** (*Exocoetus*). One of a group of tropical fishes. It includes over forty species which have the pectoral fins so lengthened as to resemble wings. They are in the habit of leaping out of the water to escape their enemies, and taking long skimming flights above the surface, supported by their distended fins, which are not used as propelling instruments.

**Flying Fox.** Erroneous name for the fruit bat, of the genus *Pteropus*. It is due to the fact that



its head slightly resembles that of a fox. Unlike other bats, which it greatly surpasses in size, it feeds entirely on flowers and fruit. It is found in S. Asia, the E. Indies, Madagascar, Australia, and some of the Pacific islands. The largest species, that of Malaya, *Pteropus edulis*, measures over 5 ft. between the tips of the wings, and is considered a great delicacy. The fruit growers of Australia suffer much from its depredations, and in 1920 the Queensland dept. of agriculture made the experiment of employing flame projectors against it. See Bat.

**Flying Lemur** (*Galeopithecus*). Popular name for the colugo of Malaya. The loose skin along the



Flying Lemur, *Galeopithecus*, with skin distended for gliding

sides of the body and neck spreads into a kind of parachute when the animal launches itself into the air, enabling it to cover at one bound as much as 70 yds. from tree to tree. It feeds chiefly on leaves.

**Flying Machine.** Any heavier-than-air machine designed for mechanical flight. The term is now usually applied to an aeroplane in contradistinction to an airship. See Aeroplane.

**Flying Officer.** Royal Air Force title for officers, other than those who have specialised as observers. Officers of equal rank who are employed as observers, having specialised in this branch, are known as observer officers.

**Flying Phalanger** (*Petaurus*). Small squirrel-like opossum, of which there are three species, found



Flying Phalanger, a squirrel-like marsupial

only in Australia and New Guinea. It is able to take long gliding leaps through the trees, partly supported by a membranous extension of skin. It feeds upon insects, fruit, and blossoms.

**Flying Speed.** Normal speed which an aeroplane must maintain in order to remain in the air, or the actual air speed of a machine necessary for its support in the air. This must not be confused with the apparent or ground speed of the machine. See Air Speed.

**Flying Squid** (*Ommastrephes sagittatus*). Species of squid or cuttle fish.

Long and narrow in shape, it is common in the open seas, and forms an important part of the food of the sperm whale. It is often called the sea arrow, from its habit of darting backwards out of the water for a considerable height.



Flying Squid, a cuttle fish which springs out of the water

**Flying Squirrel** (*Pteromys*). Squirrel found in N. America, Asia, and E. Europe. Members of this group are able to simulate flying



Flying Squirrel of North America

by the extension of the loose, lateral folds of their skin. There are a large number of species, varying considerably in size and colour, and all are nocturnal in habit. See Squirrel.

**Flysch.** Geological formation. It consists of enormously thick series of sandstones and shales, occurring in the Alps, Apennines, Carpathians, Istria, Dalmatia, Bosnia, Greece, Asia Minor, Caucasus, stretching through S. Asia and still further East. Their exact age is uncertain, but varies from lower Cretaceous to middle Tertiary. They represent a phase of deposition of sediments of long duration and great geographical extent.

**Fly-wheel.** Large, heavy-rimmed wheel mounted on a shaft which is subjected to, or has to exert, a turning effort more or less intermittently. By virtue of its inertia it acts as a reservoir of energy and has a powerful steadying effect. A fly-wheel is essential on any crankshaft driven by reciprocating engines which by themselves would not keep the shaft in continuous motion, to help the crank or cranks over their dead centres (*q.v.*), and, even where there is continuous motion, to prevent it being spasmodic through sudden fluctuations of load, or, in the case of the internal-combustion engine especially, of turning force. See Steam Engine.

**Foal.** Young of the horse and of the ass, of either sex. The term colt has come to be appropriated to the young male animal; filly, a

diminutive of foal, to the young female, but formerly the distinction was less rigid. The word is connected ultimately with Gr. *pólos*, foal, and Lat. *pullus*, young animal.

**F.O.B.** Abbrev. for free on board. When goods are sold f.o.b. it means that the price quoted covers all charges until they are placed on board ship.

**Focal-plane Shutter.** Appliance for very rapidly uncovering and re-covering the photographic

plate in photographing quickly moving objects. It is an opaque flexible blind mounted on spring rollers close in front of the plate, and having in it either several slits of different widths or one slit the width of which can be altered. The plate can thus be exposed for a time ranging from  $\frac{1}{100}$ th to  $\frac{1}{1000}$ th of a second, according to the width of the slit and the tension at which the spring is set. See Photography.

## FERDINAND FOCH : FRENCH SOLDIER

Sir W. Beach Thomas, K.B.E., Special Correspondent of The Daily Mail

*This biographical sketch should be supplemented by the articles on the various battles of the Great War, especially those of 1918 when Foch broke down the German resistance. See Clemenceau; French;*

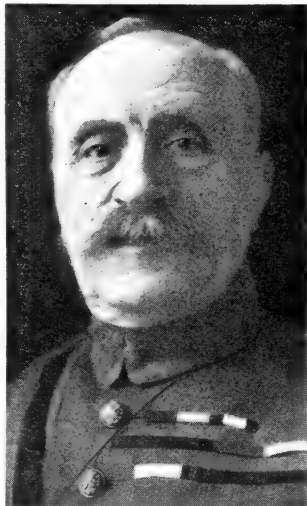
*Haig; Pétain*

Ferdinand Foch bears a surname probably derived from *fioch*, a local word meaning fire. The Foch family belonged to Valentine, a town in the Haute Garonne, and Foch, like Joffre, is of southern stock, both on his mother's and father's side. His father, Bertrand Jules Napoléon, left his ancestor's woollen trade to become a civil servant. Ferdinand Foch was born at Tarbes on Oct. 2, 1851. A younger brother, Germain, became a Jesuit, a fact of cardinal importance in Foch's career.

Ferdinand was a studious boy. At 12 years old his favourite reading was Thiers' History of the Consulate and Empire, and he always earned high commendation from his instructors. He was educated wherever his father's movements dictated: first in Valentine, then in St. Étienne, at the Collège S. Michel, which was under the direction of the Jesuits. After taking his degree there he was sent to the Collège de S. Clément at Metz. In 1870 the Franco-Prussian War broke out, and Foch enlisted.

After the war he at once returned to Metz, but at the end of a year entered by request the engineering and artillery establishment at Fontainebleau, which he left as 2nd lieutenant in 1874. He was first attached to the 42nd regiment of artillery stationed at Tarbes. Two years later he took a course at the cavalry school at Saumur, and in 1878 was made captain of the 10th regiment of artillery. He was one of the officers picked for the school of war in 1885, and on leaving it was put on the staff of a division. He was appointed to the general staff in 1894, a year later appointed associate professor, and later full professor, of military history, strategy, and applied tactics at the École Supérieure de Guerre, or staff college.

Foch's lectures there made his name, first in France, then outside. The bulk of them were collected in two books, The Conduct of War and The Principles of War, the latter translated by H. Belloc, 1918; both have become classics. They are not narrow military treatises. Much space is



devoted to will power and moral force. The

general argument is that, though the art of war is simple, few can acquire it, for its execution is complicated and it demands the highest will, purpose, and strength in a commander who can impart them to his soldiers.

In 1901 Foch was sent to command a regiment. It was generally held that his religious belief, and the fact that a brother of his was a Jesuit, were the causes of this transference, which seemed to in-

volve a great setback in his career. In 1903 he was appointed full colonel, in 1905 chief of staff to the 5th Army Corps, in 1907 brigadier-general with a position on the general staff. Clemenceau had just become prime minister, and offered General Foch the command of the École de Guerre. His 4½ years in that position were invaluable to France. He made good officers, and was intensely admired by his pupils. His work was done when in 1911 he became general of division, in 1912 of the 8th Army Corps, and in 1913 took command of the 20th Army Corps at Nancy.

On four critical occasions during the Great War, before he was appointed generalissimo, Foch proved his principles in action, first in the defeated French offensive, and the subsequent defence of Nancy in Aug., 1914; secondly, at the battle of the Marne in Sept.; thirdly, with the British at Ypres in Oct. of the same year; and fourthly, on the British right flank in the battle of the Somme, which began on July 1, 1916. As soon as Nancy was saved, largely through the 20th corps under Foch, Joffre called on him to form and command a new army, the 9th.

This was Aug. 24. The work was done with amazing speed and thoroughness, and on Sept. 5 the battle of the Marne began, Foch having his headquarters at La Fère. The turn of the tide was marked by a dispatch from Foch that will always be famous: "I am heavily pressed on my right; my centre is giving way; I cannot redistribute my forces. The situation is excellent, and I shall attack." He attacked and won.

Again on July 1, 1916, Foch shared in one attack, taking the right wing on both sides of the river Somme. His artillery work was so perfect that the first advance of the infantry were singularly bloodless, and the success overwhelming at every point. On Sept. 30, 1916, Foch reached the age limit. He was given the military medal, kept on the active list, but taken from any particular command. On Dec. 13 he became director of a new bureau for the study of inter-Allied questions.

He soon began to press for the creation of a strong Allied reserve, and it was decided early in 1918 to give the command of it when formed to Foch. But other counsels began to prevail, and against his earnest protest the inter-Allied reserve was whittled down. Then came the very critical German offensive on March 21, 1918. The way to Paris lay open, a wedge was driven between

*F. Foch*  
Olive Edis, F.R.P.S.



French and British, and the imminence of the danger brought everyone round to the principle of unity of command.

A momentous inter-Allied conference took place at Doullens on March 26, as the result of which Foch became "Generalissimo of the French, British, American, and Belgian forces fighting upon the western front." After checking the final German offensive opened between Reims and Soissons on July 15, Foch on July 18 launched his decisive counter-offensive on the Marne, the result of which was seen when on Oct. 28 the German message agreeing to an armistice on the basis of President Wilson's Peace note came, and on Nov. 11 the armistice was signed. General Foch, who was elected marshal of France on Aug. 6, showed his great qualities in the peace as in the war. He was the chief cause of the acceptance of the German offer, and largely framed the preliminary terms of peace. He had indeed "deserved well of his country," as the deputies unanimously voted on Nov. 11, 1918.

But he had yet much to do: the organization of the advance to the Rhine and the bridgeheads, repeated conferences at Spa and Trèves with the Germans and Allied leaders. In every act of a continuously strained situation his opinion was the master opinion.

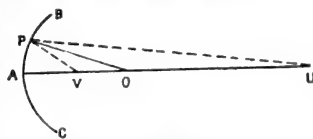
Throughout all this strain Marshal Foch, in spite of illness, and even when his son was killed, lost none of his calm, and at every juncture gave those who met him the sense of a man who possessed in himself an inexhaustible reserve of quiet confidence, founded on force of will and clearness of intellect in effective combination. See Marshal Ferdinand Foch, A. H. Atteridge, 1919; Foch, His Character and his Leadership, Raymond Recouly, 1920.

**Fochabers.** Village and tourist resort of Elginshire, Scotland. It stands on the Spey, 8 m. S.E. of Elgin, and is the trading centre for the surrounding district. Near is the duke of Richmond's seat, Gordon Castle. Pop. 972.

**Focsani, Focshani or Fokshani.** Town of Moldavia, Rumania. It is 90 m. N.E. of Bukarest, about 4 m. from the river Sereth, and was in normal times a prosperous agricultural centre, with a considerable grain trade. Fortified, it formed a bridgehead on the Sereth line during the Great War; it was the scene of very bitter fighting in the first week of Jan., 1917, falling on Jan. 8 to the Germans. Pop. 25,000. See Rumania, Conquest of; Sereth, Battles of the.

**Focus** (Lat., hearth). Primarily the point at which converging lines or rays meet, but usually any point through which rays of light, heat, etc., or lines pass.

In mathematics a focus is a point from which, if lines are drawn to any points on a curve, the lengths of these lines are connected by some law, e.g. in a parabola any point on the curve is equidistant from the focus and a fixed straight line.



**Focus.** In the diagram C A B is part of a spherical mirror whose centre is O. A ray of light from U strikes the mirror at P, and is reflected along P V. The angle U P O is equal to O P V.

In optics, sound, heat, etc., where rays or waves are considered, the focus is the point to which the rays are brought after reflection from a curved surface or after refraction through a lens. See Conic Sections; Concave Mirror and Lens; Convex Mirror and Lens; Lens.

**Fodder.** Name applied to the bulky part of the food of stock. It may be either green and succulent, or dry, like hay or straw. The first of the four chambers of the stomach of cud-chewing animals, such as the ox, sheep, and goat, is very large, and digestion cannot go on properly unless it is well filled. Fodder is, of course, more or less nutritious, but it is rendered bulky by the presence of a large amount of fibre, only a small part of which can be digested. Fodder thus contrasts strongly with grain and artificials, such as the different kinds of cake, which contain nutriment in a highly concentrated form.

**Foetus** (Lat., offspring). Biological term meaning the young of an animal, usually with reference to a visible embryo either in an egg or within the womb. The term is applied to that stage of the development of the embryo after its various parts can be distinctly distinguished up to the period of birth. See Embryology.

**Fog.** Clouds either close to or in contact with the ground. The conditions for the formation of clouds are the presence of dust and water vapour in the atmosphere, and the falling of the temperature of the air below dew point, i.e. that temperature at which the atmosphere is incapable of holding its invisible water vapour without condensation. If these conditions are fulfilled, each particle of dust receives a thin coating of water. In the

country, fog is usually white, but in large towns and cities it is sometimes dense and black.

Extensive fogs are also produced where currents of air of different temperatures come in contact with each other. Thus, off Newfoundland, the warm air from over the Gulf Stream Drift meets the air chilled by the cold Labrador current, and the region is probably the foggiest in the world. Valley bottoms and low-lying meadows frequently experience light fogs or mists due to the chilling of the lower atmosphere during the night, but such fogs are usually dispersed by the morning sunshine, except in winter, when the sun's rays may be of insufficient strength. Extensive fogs are prevalent over lowlands during spells of cold but quiet weather. See Cloud.

**Fog SIGNALS.** Warning or information given by various contrivances, usually for producing sound, when visual signals are obscured by atmospheric conditions.

On the roads horsed vehicles sometimes use bells, motor vehicles their normal horn equipment. On railways detonators clamped to the rails and exploded by the approaching engine warn its driver of danger. Fogmen exhibit red flags or lamps, subsequently notifying the all-right position by changing to green. Various mechanical and electrical devices for communicating these signals from signal-box to driver have been proposed.

On the sea, in fog, mist, snow, or heavy rainstorm, board of trade regulations require vessels at anchor to ring bells, steamships under way to sound whistles or sirens, sailing vessels foghorns, fishing craft bells and horns alternately, all according to a prescribed code.

The prototype of modern coast-signals was the medieval bell, as on the Inchcape Rock (q.v.). Bell-buoys are numerous in Great Britain, whistling buoys in the U.S.A. In pierhead and breakwater bells the clappers are operated by clockwork, sometimes motor-driven. Two-ton bells, with a 14-m. range, have been used. Some ports and harbours have reed-horns, some lighthouses Maitland bell-mouth guns. Guncoiton rockets, introduced in 1878, are now superseded, especially on rock stations such as Eddystone, by explosive signals, usually tonite cartridges on iron jibs, detonated electrically at fixed intervals. Unattended acetylene fog-guns in the Clyde are switched on by wireless energy transmitted from aerials on Gourock pier. Steam or air whistles, general in N. America, are sometimes fitted with megaphones.



**Fog Signal.** Left to right: explosive cap with flanges folded, as kept in store; flanges opened for adjustment to rail; cap attached to rail

The most powerful contrivances are trumpets—22 ft. long at St. Catherine's Point—attached to compressed-air sirens. - These usually comprise two slotted disks or cylinders. In Canada single-cylinder diaphones have slots alternately covered and uncovered by piston-strokes. Mushroom trumpets, as on the Caskets, distribute sound all round the horizon. The siren at Platt Fougère, Guernsey, has been heard 33 m. away. Sound-direction is attempted in America by megaphones rotating singly, or by eight megaphones fixed radially, short and long blasts of Morse-signal type being sounded according to the compass direction. Topophones are double-trumpet receivers with ear-pieces, for direction-finding.

Under certain atmospheric conditions soundless zones are interposed between near and distant audible zones. Hence the utility of submarine bells, placed on sea-floors, buoys, and light-vessels, and audible to ships fitted with ears having a 10 m. range, and connected with telephone receivers on the bridge. In Oct., 1920, it was decided to lay down in French ports submarine cables emitting during fog musical sounds audible through similar telephone receivers. In 1910 the United Kingdom had 308 coast-signals; Canada, 215; France, 48; U.S.A., 407.

As to aircraft, aviation sound-signalling is in its infancy. Owing to the dominating noise of the propellers, bells, horns, and whistles are practically ineffective. Airships at rest, when hearing the propellers of an invisible neighbour, sometimes fire pistol-shots. Under suitable conditions aircraft and aerodromes use Very lights and directional wireless to facilitate landing in fog. The crashing of an American dirigible against a Californian mountain-peak in fog on Sept. 30, 1920, shows that complete immunity from fog perils is unattainable by external signalling alone. See Foghorn; Siren.

**Fogaras.** Former county of Austria-Hungary, in Transylvania, now belonging to Rumania. It is traversed by the Fogaras Mts., which constitute part of the Transylvanian Alps, the loftiest peak being Székara, which reaches an alt. of 7,570 ft. The capital is Fogaras.

**Fogaras.** Town of Rumania, in Transylvania, formerly in Austria-Hungary. It is on the river Aluta, 55 m. E. of Hermannstadt, and N.W. of Kronstadt (Brasso), and is the capital of the county of Fogaras. Taken by the Rumanians in their campaign against Austria, Sept., 1916, it was evacuated by them Oct. 4-5, when the Rumanian second army retreated towards Kronstadt, yielding up the Fogaras-Vlădeni sector. See Rumania, Conquest of.

**Fogazzaro, ANTONIO** (1842-1911). Italian poet and novelist. He was born at Vicenza, March 25,



*St. James*

1842. His first poems, 1863, were followed by a poetic romance, *Miranda*, 1874, and a volume of lyrics, *Val-solda*, 1876, which established his reputation as a poet. These were succeeded by the stories, *Malombra*, 1882, and *Daniele Cortis*, 1885. In 1888 came his first considerable success, the idyllic *Mistero del Poeta*; then the notable trilogy, *Piccolo Mondo Antico*, 1895; *Piccolo Mondo Moderno*, 1901; and *Il Santo* (The Saint), 1906; the last of which, his most famous work, was translated into most European languages. A staunch Roman Catholic, Fogazzaro sought to reconcile the theory of evolution with the teaching of his church; he has been described as Italy's modern poet of hope and faith. He died March 7, 1911. See *Study* (in French) by L. Gonnari, 2nd ed. Paris, 1918.

**Fog-bow.** White-coloured rain-bow sometimes seen in a thick fog. It is due to the extreme smallness of the floating drops of water which constitute the fog.

**Fog Crystal.** Phenomenon observable during fog and frost. Fog crystals are usually formed by particles of ice on surfaces in a fog, in frosty weather, as the fog is driven over those surfaces. These crystals, most common in hilly districts, are feathery in appearance, often reach several feet in thickness, and form with great rapidity in favourable conditions. See Frost; Snow Crystal.

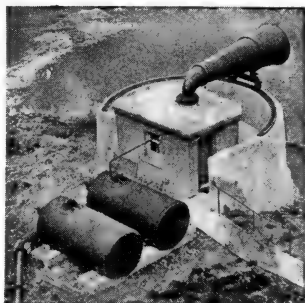
**Foggia.** Prov. of S.E. Italy, formerly known as *Capitanata*. Bounded N. and E. by the Adriatic Sea, it has an area of 2,683 sq. m. Mountainous in the N.E. and W., the central part is occupied by the fertile plain of Apulia. The coast is low and flat, and the climate hot and dry. There are numerous rivers, the chief of which is the Candelaro, with many tributaries. The lakes of Lesina and Varano lie in the N. of the prov., and the Lake di Salpi in the S.E. The highest point is Monte Calvo, which has an elevation of 3,460 ft. Vast flocks of sheep are pastured on the plain. Pop. 484,557. *Pron.* Foj-ja.

**Foggia.** City of Italy, capital of the prov. of Foggia. It stands in the centre of the Apulian plain, 78 m. E.N.E. of Naples, and 20 m. W. of Manfredonia, a junction of the coast rly. and the lines to Benevento and Potenza. The 12th century Gothic cathedral was partly destroyed by an earthquake in 1731, and rebuilt. An important fair is held every May for the sale of sheep, wool, corn, capers, and cheese.

An ancient city, Foggia was a favourite residence of the emperor Frederick II, whose English wife, the daughter of King John, died here. Three miles N. of the city are traces of the ancient town of Arpi, or Argyripa, reputed to have been founded by the great hero, Diomedes. Pop. 79,213.

**Foghorn.** Instrument carried by ships to indicate their presence to other vessels during a fog at sea. Foghorns differ in shape. A common type looks like a chimney cowl. Board of Trade regulations require sailing vessels under way, and vessels towed, to sound foghorns at one-minute intervals. They may be operated by mouth, hand, or mechanical power, and make a raucous sound in monotone, of uniform or varying intensity.

The types designed for shore use are especially employed for port and harbour signals. The note is



Foghorn installed on the Bass Rock

usually produced in reeds with metal tongues like organ-pipes, which may be manual or engine-driven. The more powerful horn installations used on steam vessels, and some coast stations, are technically called sirens.

**Fogo** (Port., fire). Volcanic island of the Cape Verde archipelago. Circular in shape, and mountainous in character, it has an area of about 190 sq. m. The loftiest point, the Pico do Lano, nearly 10,000 ft., has often been in eruption, notably in 1847, when it caused immense damage. Fertile in the N., where coffee, sugar, maize, and fruit are produced, it is almost barren in the S. The chief town and port is São Filipe, or Nostra Senhora da Luz—our Lady of Light. Pop. 16,500.

There is another island of this name off the N.E. coast of Newfoundland in lat. 49° 40' N. and long. 54° 10' W.

**Föhn** (Ger.). Warm, dry wind experienced in Alpine valleys. In the circulation of the atmosphere air is caused to descend mountain slopes. During its descent it is heated by compression, and being thus enabled to hold more moisture, it descends as a warm, drying wind, which in a few hours clears away more snow than many days of bright sunshine, and uncovers the upland pastures.

In some valleys the early sowings are entirely dependent upon this wind, whilst in others it is relied upon to ripen the grapes in autumn. Strictly the term should not be used of a wind, but merely of the effect of descent upon a wind. The föhn effect may be recognized in most mountainous areas in temperate latitudes.

**Föhr**. Island in the North Sea, one of the N. Frisian group, belonging to Germany. It lies off the W. coast of Slesvig, opposite Dagebüll on the mainland, and has an area of 32 sq. m. Largely marshland, protected in the N. by dykes, it is elsewhere elevated and timbered, with fertile soil. The inhabitants

live by wild-fowling, fishing, and sea-faring. The chief town is Wyk, which is a resort on the E. coast. Pop. 4,500.

**Foie-gras** (Fr., fat liver). Livers of geese enlarged abnormally by keeping the birds in a heated compartment, and made into the paste known as *pâté de foie-gras*. The Strasbourg variety is well known. See Goose.

**Foil**. Weapon used in fencing. It is a very slender, four-sided steel blade, with a handguard to the hilt, and a button on the tip, the object of the fencer being to touch some part of his opponent's body with that button. See Fencing.

**Foil**. In metallurgy, a thin form of metal, which may be said to occupy a position intermediate between a leaf, as gold leaf, and sheet metal. A very thin tinfoil is made for chemical and electrical uses, and for backing mirrors; tinsel is a rather thicker foil much used for theatrical purposes; Dutch foil is specially prepared for the backing of artificial gems, being made very thin, and coloured by means of Prussian blue and other pigments. Gold foil is used by dentists for stopping teeth.

Ordinary commercial tinfoil, largely used for wrapping tobacco, chocolates and other sweets, and toilet articles, is made of lead coated on one or both sides with tin, the two metals being rolled together so that they become quite inseparable. The tin surface may have merely an infinitesimal thickness, yet it is sufficient to prevent contact with lead. The latter metal contributes the substance and the flexibility to the foil; the tin, which is much the more expensive metal, provides the non-poisonous surface.

Attempts have been made to substitute aluminium in the manufacture of foil, on account of its light weight, but so far without much success. A beautiful variegated foil, which we owe to the Japanese, is made by soldering together by their edges 30 or 40 thin sheets of gold, silver, copper, and

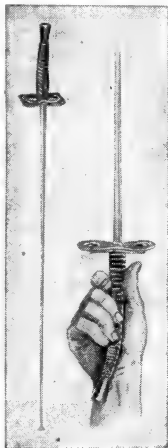
various alloys; punching or cutting a pattern through these sheets, the holes going to varying depths, then rolling down the "book" of sheets to the desired thinness. The holes entirely disappear in the finished product.

**Foix**. Town of France, capital of the dept. of Ariège. It stands between the rivers Ariège and Arget, 46 m. S. of Toulouse. Its interest is mainly historical. The capital of the county of Foix, the powerful counts of Foix lived in its castle, of which there are some remains on the rock, round which the older part of the town clusters. The church of S. Volusien dates from the 14th century. There are some small industries, and the town is the commercial and administrative centre for a large district. The county of Foix varied in extent from time to time. It was ruled by its counts, vassals of the king of France, and was one of the provs. into which France was divided before the depts. were created. Pop. 6,806. *Pron.* Fwah.

**Foix**. French family, rulers of the county of Foix, between about 1000 and 1500. A Roger, a descendant of the count of Carcassonne, first assumed this title when he inherited the lordship of the town and the surrounding lands. A succession of counts followed, who, like other nobles of the time, went on crusades; fought with neighbouring rulers; at times defied the king; frequently quarrelled with the Church; and had their own special feud with the family of Armagnac.

About 1300 one count married the daughter of Gaston, viscount of Béarn, and this union brought to the family the name of Gaston, and also the district of Béarn. The counts were now much more powerful than formerly, and this culminated in the career of Gaston Phoebus, whose splendid court is so vividly described by his guest, Froissart. For forty years he was almost constantly at war, but he found time for the things of the mind. He died in 1391, leaving to Charles VI his possessions of Foix and Béarn.

Charles gave these to a descendant of one of the earlier counts, and a second ruling family arose, to play the part of great French nobles for another century. They married into the royal families of France and Navarre, and in 1479 one of them, Francis Phoebus, became king of Navarre. He left no sons, so the county passed to his sister, the wife of Jean d'Albret, and thence to the family of Bourbon (*q.v.*). Henry IV, on becoming king of France in 1589, added Foix to



Foil, fencing weapon, showing method of holding

the royal domain. A member of a younger branch of the family was the famous soldier Gaston de Foix (1489-1512). An earlier member was Peter, a cardinal and archbishop of Ailes.

**Fokchany.** Alternative spelling of the Rumanian town Focsani (*q.v.*).

**Fo-Kien** OR FU-KIEN. Coast prov. of China, lying almost entirely between lat. 24° and 28° N. Area, 46,332 sq. m. The prov. is mountainous, comprising a series of ranges running parallel with the coast. The chief waterway is the river Min, 260 m., which flows into the sea below Foochow, the capital. Fo-Kien is noted for its tea and timber, but the value of the tea trade has steadily diminished. Minerals abound, but have not been worked. Fishing is an active industry. Amoy is an important town. Pop. 8,560,000.

**Fokker.** German type of aeroplane (*q.v.*). It secured much notoriety during a stage of the Great War. A. H. S. Fokker was a Dutch aviator who just before the outbreak of war was building monoplanes in Germany. For war purposes he evolved a very fast biplane with which the Germans gained a considerable amount of success until they were met by better pilots and machines. Fokker also produced a triplane which in many respects was a copy of the Sopwith triplane.

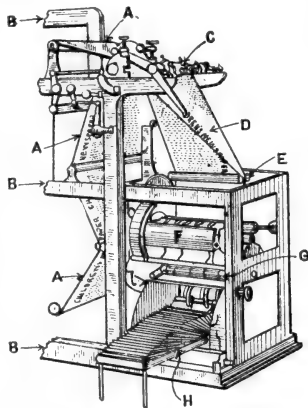
**Fold.** In geology, the curvature of strata induced subsequent to their deposition in more or less horizontal layers. The result of lateral compression due to movements of the earth's crust, it varies in complexity. The simplest form of flexure is in one direction, monocline; folding round a dome is termed *quaquaversal*; that forming a basin *centroclinal*. Symmetrical folding about an axis may result in production of troughs (*synclines*) or of arches (*anticlines*). Doubling over of beds forms *overfolds*, which are termed *recumbent* when the axial plane is nearly horizontal. Irregular complex folding results in contortion. See Earth-movement; Geology; Rocks.

**Folding Machine.** Machine primarily in use in printing to convert into sections the flat sheet of printed paper as it comes from the press. Before its adoption these flat sheets were folded by hand.

Each class of machine varies in its action, but generally the folded sheets are automatically fed up to a side-gauge on the machine bed, and then brought to the correct position by an automatic device to ensure accurate folding. A descending blade then presses the sheet between two revolving rollers through which the sheet passes, thus mak-

ing the first fold. The sheet then travels to the second pair of rollers, set at right angles to the first pair, where a similar action is performed, and so on for each succeeding fold.

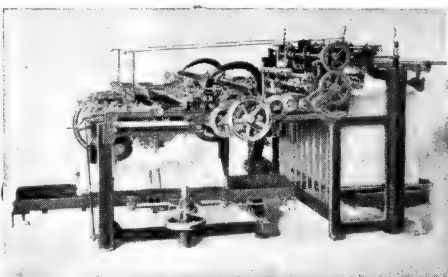
Some machines are made for parallel folding, i.e. folding the sheet over and over in the same direction by blades and rollers parallel with each other operating consecutively. Imagine the first fold down the centre of one way of the sheet and the second fold parallel with the first; we then have the sheet the original length one way, and one-fourth the original length the other way; a third parallel fold is then made, and as this enters the delivery it is slit into sections by slitting disks. Thus a



**Folding Machine.** Diagram illustrating mechanism of folder section of newspaper press. A. Endless paper web. B. Main frame of machine. C. Rotary knife to slit paper. D. Paper over V plate. E. Rollers to bend paper. F. Folding cylinder. G. Folding roller. H. Copies ready folded

work, 128 pages, of the same size as the Universal Encyclopedia would consist of 8 sections of 16 pages folded in the manner last described, 2 sheets each 40 ins. by 54 ins. being converted into 4 sections 10 ins. by 6½ ins. This principle of parallel folding is adapted to printing machines producing magazines. For example, The London Magazine is printed and folded in 96 pages at one operation and delivered in six sections of 16 pages.

In all the latest styles of folding machines the sheets are fed in auto-



**Folding Machine.** Double sixteen book-folding machine, constructed to fold a sheet into two lots of 16 pages, one lot inserted in the other, to make a section of 32 pages

matically, and in some instances sheets are supplied from piles, folded, gathered, stabbed, and the covers glued on before delivery.

The uninitiated have probably been puzzled as to the reason of letters in the bottom margin of a book; these are identification marks, and indicate the sections in which the book is folded, thus, the first page of the first section of 16 pp. or 32 pp. will be marked A and the first page of the second section B and so on. These letters enable the sections to be collected in their right sequence instead of by pagination.

Newspapers are folded by means of an auxiliary part of the printing press. The endless web of paper travels over a V-shaped plate, forming the first fold or spine of the newspaper; the web continues its course (now in page size) until it reaches another section of the machine, the next fold being then accomplished by means of a turning blade which is attached to and rotates in a cylinder. There are many types of folding machines for box-making, notepaper folding, etc.

A. E. Blayney

**Foleshill.** Parish and village of Warwickshire, England. It is 3 m. N.E. of Coventry and is really an industrial suburb of that city, having manufactures of the same kind, while around are collieries. The church of S. Lawrence was restored in 1889. Foleshill has a station on L. & N.W.R. Pop. 7,780.

**Foliation.** In geology, a structure characteristic of metamorphic rocks, particularly of schists. It consists of the arrangement of the rock-material in more or less parallel, sometimes lenticular, and frequently undulating layers. Splitting usually takes place readily along these layers. See Rock.

**Foligno** (anc. *Fuliginium*). City of Italy, in the prov. of Perugia. It stands in a beautiful valley, on the river Topino, 23 m. by rly. S.E. of Perugia, and is enclosed by medieval walls. It has a 12th century

cathedral, which has been modernised, several old palaces, and a picture gallery. There is trade in paper, leather, parchment, silk, and soap. An ancient city, it became a place of considerable importance, but was razed to the ground in the wars of the 13th century. Rebuilt, it was greatly damaged by earthquakes in 1831 and 1832. Pop. 28,373.

**Folio** (Lat. *folium*, leaf). In bibliography, a book of the largest size, the sheets of which are folded once into two leaves, making four pages. For convenience in binding, two or more sheets are inserted into each other. In all but modern books the watermark of the paper is seen in the centre of the page if the work is a folio; if in the middle of the inner margin, divided by the fold at the back of the book, with the chain lines horizontal, the book is a quarto (*q.v.*).

The word folio is applied to the numerical mark on each page of a printed work or each leaf of MS. It is used to indicate the number of words in a page of law writing, or report of parliamentary proceedings, to a case for holding music, and, in book-keeping, to the two facing pages of a ledger or account book containing respectively the creditor and debtor accounts. In 16th century English the word was used to mean "on a large scale." See Book; Paper. Sizes of.

**Folkestone.** Mun. bor., watering-place, and market town of Kent. It stands on the English Channel.



**Folkestone arms** ing a splendid view of the sea—pleasure gardens, a theatre, and a pier. Radnor Park is a public pleasure ground, and

there are tennis courts, golf links and a racecourse. The bathing is good. Between Folkestone and Dover is a large open space called the Warren, an extensive landslide, in which numerous fossils are found. In 1920 this, with the east cliff, was given to the town by the earl of Radnor.

Folkestone consists of an old town in a valley, now the fishing and shipping quarter, and a newer town on the hills around, where are spacious roads and buildings. The chief church is dedicated to St. Mary and S. Eanswith; it is an Early English building, with a fine tower, much restored. There are also modern churches and several fine hotels. The town has a 17th century grammar school, a technical school, a public library and museum, hospitals, etc. Many schools are located here. As a seaport Folkestone has been much improved during the 20th century, both harbour and pier having been enlarged. It is one of the chief ports for the service to France and Holland, there being a regular connexion with Boulogne and Flushing. The herring and mackerel fisheries are important.

During the Great War it was a port of embarkation for the troops. It suffered from air raids, the most serious being one by 17 aeroplanes

on May 25, 1917. Folkestone was in existence before the Norman Conquest. It became, and still is, a member of the Cinque port of Dover, and was early a corporate town. There was a monastery here from about 1095 until the time of Henry VIII, and also a castle. It is now governed by a mayor and corporation. The council still derives a considerable income from the coal dues collected in the port. There are memorials to William Harvey, who was born here, and in the neighbourhood is Shorncliffe camp. Much of the land belongs to the earl of Radnor, whose eldest son is called Viscount Folkestone. Pop. (1921) 37,571.

**Folkland.** Name given in England in Anglo-Saxon times to the land that was held by folk or common right and subject to certain established burdens. Until 1893 the prevailing idea was that it was the common land of the nation, as opposed to bocland, which was in the nature of private property; but in that year Prof. Vinogradoff established the modern theory. This assumed that practically all the land of the country was folkland, although the king could by grant convert it into bocland. See Domesday Book and Beyond, F. W. Maitland, 1897.

## FOLKLORE: ITS ORIGINS AND STUDY

E. S. Hartland, Author of *The Science of Fairy Tales*

*There are in this work articles on the various characters in folklore, among them Cinderella; Fairy; Gentle; Roc; Valkyrie; Witch.*

*See also Legend; Mythology*

The term folklore was suggested by W. J. Thoms, the antiquary, in 1846, to replace the more cumbersome title of popular antiquities, hitherto employed for the traditional tales, songs and sayings, customs and superstitions of the peasantry. On the foundation in 1878 of The Folk-Lore Society, it was adopted and incorporated into the name of the society. But researches and inquiries have since compelled a broader view. All the evidence

those of modern savages; resemble them in particular in the one essential feature that they are traditional; and may reasonably be supposed to be ultimately derived from a social condition represented by many tribes who are still living in a low state of culture.

Accordingly in the second edition of *The Handbook of Folk Lore*, issued by the society in 1914, the definition adopted for the term folklore was "the generic term under which the traditional beliefs, customs, stories, songs and sayings current among backward peoples, or retained by the uncultured classes of more advanced peoples, are comprehended and included." The same term is used for the scientific study of these objects; and folklore as a science may be more succinctly and exactly defined as the study of tradition.

To quote the handbook again: "Folklore is the expression of the psychology of early man, whether in the fields of philosophy, religion, science and medicine, in social organization and ceremonial, or in the more strictly intellectual regions of history, poetry and other



Folkestone. The Leas, looking westward



literature." It thus embraces the whole outlook of uncultured man upon the world, his beliefs concerning his own nature and destiny, his relation to other beings, whether objective or imaginary, whether human or non-human, the rites and customs which are the outcome of his beliefs and the expression of these varied relations, and, finally, the amusements of his vacant hours.

The English use of the word *folklore* does not include, as the corresponding German word *Volkskunde* does, the technology of the arts and industries practised either by the unlearned classes of civilized peoples or by the uncivilized or semi-civilized peoples of distant regions. The English student of folklore is concerned rather with the non-technical rules which govern the employment of implements, and with the ceremonies and taboos observed in relation to them, for these reveal the deeper thoughts of the community and the direction of its mental and spiritual life.

#### Old Devonshire Customs

Folklore may be said to be the deposit left by successive waves of culture on the minds of the community. The record is usually far too fragmentary to present anything like a history. What is preserved is that which—whether tale, institution, rite, or custom—has most deeply entered into the popular mentality. At the village of Holne, on Dartmoor, on May-morning before daybreak a ram-lamb used to be hunted down by the young men, fastened to a monolith, killed, and roasted whole. At midday a struggle took place for a slice of the animal, which was supposed to confer luck for the ensuing year on the fortunate person who ate it.

At King's Teignton, on Whit-Monday, a lamb is drawn about the parish in a cart covered with garlands. On the following day it is killed and roasted whole in the middle of the village; and slices are sold to the poor at a cheap rate. The custom is said to date back to heathen days, and to owe its origin to a drought, in which the inhabitants prayed for water. Their wants were supplied in answer to the prayer by the bursting forth of a spring, which even now is adequate in a dry summer to work three mills. The sacrifice of the lamb is said to be a votive thank-offering (Sir Laurence Gomme, *Ethnology in Folklore*, 1892).

In these two Devonshire customs it is impossible to avoid recognizing a survival from very ancient times of a sacrificial ceremony. It is a striking and picturesque rite; but from our point of view this is by no means essen-

tial to its preservation. Thousands of traditional observances are of a common-place character, some even disgusting; and it is difficult to say what quality in them caused them to survive. The prohibition, for luck, to put both shoe and stocking on one foot before the stocking is put on the other, has no striking or picturesque features, but the importance it attaches to a trifling detail in the order of dressing indicates that it descends from so remote a past that the original reason seems undiscoverable.

The belief that it is a bad omen if a child do not cry at its baptism, the prohibition in Scotland to give fire out of the house on New Year's Day, and many other precepts and beliefs obviously derive their origin from a much lower stage of culture. Of such survivals it may very often be said, in Sir Arthur Mitchell's words, that "they show the continuance among a people long Christianised of ceremonies and practices emphatically pagan." Where they cannot be said to be "emphatically pagan" they are alien in spirit from modern thought.

From time to time it has been sought to disentangle and classify such survivals, so as to show the ethnic elements of which they are composed. Thus, Sir Laurence Gomme argued that the sacrifice of the lamb in Devonshire was an inheritance from a pre-Aryan society and a pre-Aryan culture. W. H. R. Rivers instituted an elaborate inquiry into the different strata of the institutions and customs obtaining in the Melanesian islands of the South Pacific (*History of Melanesian Society*, 2 vols., 1914). He arrived at some very interesting results, but the questions raised are so complex, the influences are so numerous and varied, and many of them so hypothetical, that it cannot be said that the possibility of assigning the different elements of folklore to their original ethnic source has anywhere yet been demonstrated.

#### Folklore and the Historian

The value of folklore as a record of facts and of the succession of events is much more limited. Ancient historians—for instance, Herodotus—necessarily relied to a great extent on tradition. All through the Middle Ages, and even more recently, it was treated as authoritative. Modern historians have become more sceptical; and the untrustworthiness of oral tradition, in comparison with the more certain evidence of written documents or the statements of eye-witnesses, has been generally regarded as axiomatic.

In the lower zones of culture, however, documentary evidence of events long past is, of course, unprocurable. The evidence of tradition is the only direct evidence possible. In these circumstances some anthropologists have been disposed to rely on it for such matters as the origin and migrations of a people, the pedigree of its chiefs and rulers, the beginnings of its institutions, and the vicissitudes of its history.

#### Subjects of Tradition

Careful examination shows that this reliance is hardly justified. Illiterate persons certainly develop a greater strength of memory than those who habitually depend on books and written memoranda. But both individuals and communities differ widely in this respect: all are not gifted alike. Much depends, also, on the subject. Pedigrees may be remembered because they appeal to the vanity of a family, or because they are important in relation to the descent of property, or the headship of a clan. The interest thus aroused tends to preserve tradition. On the other hand it almost inevitably deforms it. Whether it be material prosperity, or only pride in the doings of ancestors, or the position of a family, what is sure to be insisted on is the glory and advantage of the carriers of the tradition, and the depreciation or the misdoings of their opponents; and where there is no precise record, there is no conclusive answer to their claims. These are, in a sense, private traditions.

Where a tradition is not so closely related to the interest of the individual, or of a close corporation, it is liable to become less definite, the details will be speedily forgotten, and though outstanding facts will continue to be longer remembered, they will remain isolated and unexplained. Ultimately they will pass out of memory, unless an effort to explain and account for them be made. For this explanation the imagination must be drawn on. Without any real historical sense, the story can only be reconstituted as the carriers of the tradition think it ought to have been, in accordance with their ignorance, their mental condition, and their consequent sense of the fitness of things. The result is a mere travesty of the facts, and oftentimes, indeed, is a complete reversal of them.

It might be thought that bare lists of kings or genealogies would be easily remembered by the aid of a fair memory, and would lend themselves but little to freaks of

imagination. In practice this is not so. Apart from the constant occurrence at the head of such lists of eponymous heroes whose former existence is a mere postulate to account for the name of a tribe or clan, a single example of the untrustworthiness of genealogies may be taken from the pedigrees of the chiefs of various sections of the great Thonga tribe in South Africa. It by no means follows that the names given in these pedigrees represent successive steps in the genealogy.

A step may be omitted because in the native mind for this purpose the distinction between a son and a grandson is immaterial. Steps may be duplicated, because a brother may have succeeded a brother in the chieftainship. Or a longer gap may intervene between two names represented as those of father and son. All these errors and others occur in the pedigrees in question, and the native depositories of tradition do not agree among themselves on the subject. The lists do not affect to contain the names of more than eight or ten generations, going back at the most from 200 to 250 years. Yet a Portuguese document dated in 1554 already mentions several of the names, some of which were then probably the names of clans rather than of persons, and two of them are in the document expressly stated to be the names of rivers (Junod, *Life of a South African Tribe*, i, 24-26).

#### A Typical Legend

A legend very widespread in England and other parts of the W. of Europe concerns the position of a church. It asserts that the church, generally a parish church, was intended to be built elsewhere than on its actual site, but that the materials and the building so far as erected were nightly removed by invisible powers, and that the builders were ultimately compelled to accept the site thus supernaturally chosen.

Two examples, both taken from Gloucestershire, will show how tradition may disguise, and in one case entirely reverse, the facts. The story of Bisley church is that it was to have been built in a certain spot definitely pointed out, but the stones were removed at night by the devil to its present site. Actually, the place pointed out as the intended site was the site of a Roman villa, from the ruins of which the materials for the church, or some of them, were obtained. When the church was restored in the 19th century, portions of the villa, including an altar of the Penates, were found embedded in

the walls (Gloucestershire N. & Q., i, 390). Of Churchdown church, a few miles away, on the top of an isolated hill, the tradition recorded is that it was begun "on a more convenient and accessible spot of ground, but that the materials used in the day were constantly taken away at night and carried to the top of the hill, which was considered as a supernatural intimation that the church should be built there."

The fact is that the hill-top was fortified probably from prehistoric times (the rampart is still to be seen), and the original village was there with its church, but that some time before 1170, doubtless in consequence of the greater security of the country, the village—but not the church—was removed down to the side of the hill, and the top subsequently became deserted. The tradition, now comparatively old, could not have originated until the history of the village had been forgotten.

#### Vagueness of Tradition

It may be said in general terms that the exact facts cannot be recovered from tradition after a century, or at most two. Subsequent to that they become vague, confused, and at length fade out of recollection. In France memory hardly goes beyond the Revolution. It is "a sort of chronological landmark, the only one, beside the reigns of some modern sovereigns and the war of 1870, which the people really knows" (Sébillot, *Folklore de France*, 1904-7, iv, 379). All beyond is vague or forgotten. "Before the Revolution" conveys the utmost antiquity.

Some American Indian traditions go back to the events of the 17th century. They are generally presented under more or less romantic guise, and they cannot be depended on. The Wyandots suffered a very great disaster about the years 1648-50: they were massacred, and the tribe was almost totally extinguished by the Iroquois. It might be supposed that so terrible an experience would have been deeply impressed on the minds of the people. So far, however, is this from being the case that "practically nothing seems to have been remembered" (Barbeau, *Huron and Wyandot Mythology*, 1915).

Instances like those cited might be multiplied indefinitely. They render it impossible to rely upon folklore to transmit a knowledge of events. What it does transmit is a record of the mentality of past generations and of earlier stages of civilization. Such a record is transmitted not merely by tale and song and saying, but

also—and perhaps still better—by game, institution, periodical observances, and the more intimate doings and cautions of daily and family life, as well as by the shapes taken by the beliefs in the supernatural and the uncanny. The problem for students of folklore is to unravel them, to compare them with familiar phenomena elsewhere, and to assign to each of them its place and meaning in human evolution. See *The Handbook of Folklore*, new ed., by Miss C. S. Burne, 1914, and the works there enumerated in Appendix D.

**Folk-Lore Society.** British society formed with the object of collecting and preserving the relics of folklore. It was founded in 1878, and publishes a quarterly journal, *Folk-Lore*, and also occasional volumes and periodical Transactions. It meets at University College, Gower Street, W.C., and the address of the secretary is 4, New Square, Lincoln's Inn, W.C.

**Folkmoot.** Name given to a moot or meeting of the folk or people. There were moots of various kinds in medieval times, e.g. the shiremoot. Theoretically all freemen could attend, but practically nothing is known of the matter except that among the Teutonic tribes there were meetings of this kind. In England, according to one theory, there was a folkmoot in each of the little kingdoms until these were united and the witan became the dominant assembly. See *Moot*; *Witenagemot*; consult *Primitive Folkmoors*, G. L. Gomme, 1880.

**Folk-song.** Song created by the common people, those whose cultural development has been effected, not by any formal system of training or education, but through the unconscious and intuitive exercise of natural and inborn faculties. Albeit folk-music is the creation of unlettered and technically unskilled musicians, it is not on that account embryonic, i.e. undeveloped or inferior music. The difference between the music of the people and that of cultivated musicians is one of kind, not of degree, akin rather to the difference between the wild and the garden flower—neither of which can be said to be incomplete or imperfect.

Folk-music ordinarily consists of melody only; it is very seldom—e.g. among the peasants of Great Russia—that it has been carried as far as the harmonic stage. Technically, the folk-tune is essentially non-harmonic in construction and implication, being devised by those in whom the harmonic sense is dormant. It is frequently cast in one or other of the diatonic modes, more rarely of the chromatic,

and occasionally in the major, but never in the minor mode; and it is free in its rhythm, metrically irregular, often in five-time and other compound measures. Aesthetically, the characteristic of the folk-tune is its transparent sincerity, freshness, spontaneity, naïveté, and directness of statement.

These considerations, coupled with the fact that folk-tunes are invariably anonymous, have led to speculative theories concerning their derivation. Some experts maintain that folk-songs, like other songs, were composed in the past by individuals, and have been handed down more or less incorrectly by oral tradition, i.e. that the folk-song is not a genuine wild flower, but merely a garden escape. Others contend that folk-songs are the creation, not of individuals, but of homogeneous groups or communities; that the process of oral tradition has been responsible, not only for their preservation, but for the course of their development, and, in a sense, for their actual creation; that the alterations unconsciously made by individual singers have at every stage of the evolution of the folk-song been weighed and tested by the community and accepted or rejected by their verdict; and that the life-history of the folk-song has, therefore, been one of continuous growth ever approximating to a form congenial to the taste of the community and expressive of its feelings, aspirations, and ideals.

The weakness of the individualistic theory is that it fails to account not only for the anonymity of the folk-song, but also for its distinctive national flavour, which is, perhaps, the most characteristic and most valuable of its many peculiar qualities. It is because folk-song is pre-eminently a national utterance that its preservation is essential to the musical well-being of the nation of which it is the natural musical expression. No nation has suffered more than England through the failure to realize the necessity of maintaining a close connexion between its folk and its art music, as may be seen by contrasting the foremost position which the country held in musical Europe prior to Purcell, with the humble place to which it has since been relegated.

Fortunately for the future history of English music, the efforts that have been made since the beginning of the century to collect and record its popular music have been attended with a success far greater than, in the circumstances, could have been expected. In this all-important work the

English Folk Song Society, founded in 1898, has played a leading part, having already recorded in its Journal several thousand authentic folk-songs. In addition, several selections of harmonised folk-songs have been published by musicians and collectors, e.g. Lucy Broadwood, Ralph Vaughan Williams, George Butterworth, and Cecil Sharp.

**Follen**, KARL (1795-1840). German poet. Born at Ramrod, Hesse, Sept. 5, 1795, his father was a lawyer. He was educated at the university of Giessen and became a teacher of law, but his revolutionary ideas made it necessary for him to betake himself to Switzerland and then to the U.S.A. He became a professor of German at Harvard and later a Unitarian minister at Lexington. In Jan., 1840, he lost his life when on a burning steamer. He is known by his patriotic songs. His brother, August Ludwig Follen (1794-1855), was also a poet.

**Follicle** (Lat. *folliculus*, little bag). In anatomy, a minute gland or sac such as the hair-follicles of the skin. In botany, a dry dehiscent seed case, consisting of one carpel, which opens along the ventral suture.

**Follies**, THE. Pierrot troupe which achieved popularity in London between 1907 and 1912. The Follies owed their success largely to the personality of H. G. Pélissier, "an admirable parodist, not only of words and of actions, but above all of music." Potted Plays, a series of burlesques of contemporary productions, were a popular feature.

**Following-up System**. Name given in business to the method by which possible buyers have the merits of goods brought before them more than once, by means of the post. It was developed in the United States, where the selling of goods through the post is on a very large scale, and was soon taken up in Great Britain. The system is worked from a card index containing the names of possible customers; these receive a first letter; after a time another follows, and then possibly others, until business results or the name is crossed off as hopeless. See Advertising.

**Folly**. Name given generally to a building for which there appears to be no particular use or reason. The term is of twofold origin and derives from both the French word *folie*—meaning a pleasure, a delight, or a whimsical phantasy, and as a rule applied to garden-pavilions, belvederes, or look-out towers—and from a castle built in the Welsh marches by Hubert de

Burgh. He had scarce completed it when, under the terms of a treaty with the Welsh, he was obliged to demolish the fortress. This facility was styled "Hubert's Folly."

A typical instance of what the rustic calls a folly is the Folly Gate of Brookmans Park, near Hatfield, an embattled red-brick structure of imposing design, thought to have been erected by Sir Jeremy Sambrooke in the 18th century. "Roebuck's Folly" in the grounds of Midford Park, near Bath, is said to have been built in 1700 to commemorate the winning of a fortune by the ace of clubs. The Farmers' Folly, a pillar erected at Alnwick in 1816 by the tenants of the duke of Northumberland, to testify to their appreciation of him, was completed by the duke at his own expense. Sham Castle, or "Allen's Folly," overlooking Bath, was built in 1760 by Ralph Allen. The palatial building erected at Font-hill, Wiltshire, by the author of *Vathek*, is sometimes referred to as Beckford's Folly.

**Folquet of Marseilles** (c. 1150-1231). Provençal troubadour. He was the son of a merchant from Genoa settled at Marseilles. His few surviving poems show his amorous and passionate disposition; his verses won him the admiring friendship of distinguished men and gained him a place in Dante's *Paradiso* (Book ix). He became abbot of Le Toronet, Provence, in 1198, and seven years later was made bishop of Toulouse. With Simon de Montfort he fanatically persecuted the Albigenses.

**Fomalhaut** (Arab. *fum al hūt*, mouth of the fish). Star Alpha in the constellation of Piscis Australis, the southern fish. It is a star of the first magnitude, and one of the four ancient royal stars. It can be seen low down the southern horizon in Great Britain in Sept. *Pron.* Fō-ma-lō.

**Fomentation** (Lat. *fovere*, to warm). Fold of boracic lint or similar material, wrung out in boiling water and applied to relieve pain or inflammation, or to assist the discharge of pus. It should be covered with jaconette, or oil silk, and cotton wool, in order to retain the heat as long as possible, and renewed every three or four hours.

**Fomorian** (Goidelic, sea-people, or giants). Legendary name of an early Irish race. They are claimed by some as Gaelic spirits of darkness and the sea, by others as an echo of the Viking age. Archaeology, however, points to early arrivals of Nordic "giants" from the Hebrides, and of early voyagers from the Mediterranean.

**Fonck**, LIEUTENANT (b. 1896). French airman. During the Great War he became known by his exploits in bringing down German aeroplanes. He took up flying in 1912, began his career as a military airman in the observation service, and, having transferred to the battleplane service, brought down his first German aeroplane on Aug. 6, 1916. On May 9, 1918, in the region of Montdidier, he brought down six German biplanes. This success carried him to the head of the fighting arm of the French flying service, displacing Nungesser. He fought with the British airmen in Flanders and was awarded the D.C.M. and M.C. Just before the armistice he had brought down in all 75 German aeroplanes.

**Fond du Lac**. City of Wisconsin, U.S.A., the co. seat of Fond du Lac co. At the head of Lake Winnebago, 59 m. N.N.W. of Milwaukee, it is served by the Chicago, Milwaukee & St. Paul and other rlys. It contains the Grafton Hall girls' school, a state women's reformatory, a public library, and two parks. The industries include tanning, and the manufacture of machinery, lumber products, motor-cars, carriages, and flour. Settled about 1836, it received a city charter in 1852. Pop. 21,485.

**Fondi** (anc. *Fundi*). City of Italy, in the prov. of Caserta. On the Appian Way, 11 m. N.E. of Terracina, it is enclosed by crumbling walls. Among its buildings are a cathedral, and a Dominican convent in which Thomas Aquinas dwelt. Fundi was a Volscian town of some importance. It came under the sway of the popes in the 8th century, and suffered at the hands of Barbarossa in 1534. Fondi lies in a fertile district, and in ancient times was celebrated for its wine. Pop. 11,378.

**Fonsagrada** (Sp., sacred fountain). Town of Spain, in the prov. of Lugo. It stands on the slopes of the Cantabrian Mts., at an alt. of 3,166 ft., 26 m. N.E. of Lugo. It is a mart for local agricultural produce, and carries on flour-milling and the manufacture of frieze and linen. Pop. 19,219.

**Fonseca**. Gulf or arm of the Pacific Ocean. It penetrates inland to a depth of 40 m. between Honduras, Salvador, and Nicaragua. Two volcanoes—Conchagua and Coseguina—stand on either side of its entrance, which is 21 m. wide. On the small island of Tigre in the gulf is the port of Amapali, a name by which the gulf is sometimes called.

**Fonseca**, MANOEL DEODORO DA (1827-92). First president of Brazil. Born at Alagoas, Brazil,



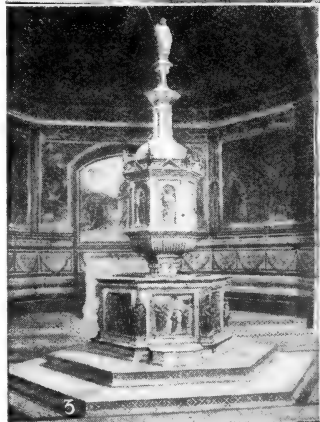
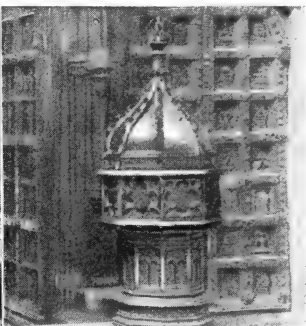
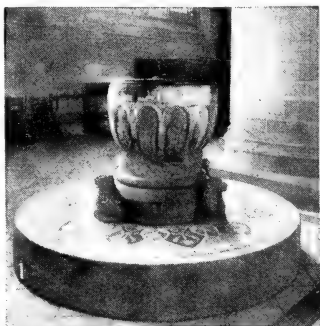
Manoel da Fonseca.  
Brazilian president

Aug. 5, 1827, he joined the army in 1849. He was engaged, 1864-70, in the fighting against Montevideo and Paraguay, and rose to the rank of general. Though sympathetic with the republican party he was a personal friend of the emperor, Dom Pedro, and was, 1886, appointed governor of the province of Rio Grande do Sul. Becoming more closely identified with the republican movement, he was recalled; he headed the insurrection which was followed by the establishment of the republic of Brazil. He was appointed its first president in Feb., 1891, but resigned in Nov. He died on Aug. 23, 1892.

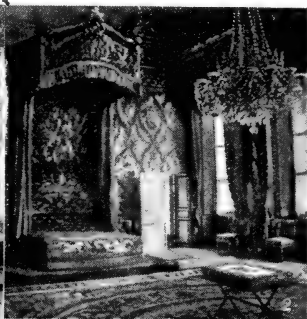
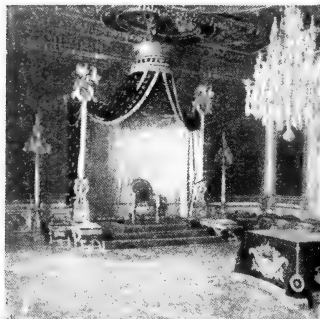
**Font** (Lat. *fons*, stem *font-*, fountain). In eccles. architecture, the basin for the rite of baptism. Constructed of either marble, stone, or lead, it was placed in a part of the church reserved for the pur-

pose, or in a separate baptistery. Since total immersion was customary in the early Christian baptism, fonts were of considerable size. Gothic fonts were often covered by a lid of elaborate construction. The church of Notre Dame at Hal, Belgium, retains a font with a heavy brass cover of this type, which is removable by a crane attached to the wall.

Norman fonts are square or round, with massive pedestals, and are often ornamented with sculptured figures or other decoration: there were few sculptured fonts before this period, the Saxon examples being mostly plain tub-shaped structures made, in the early stages, of wood. A few pre-Norman fonts, however, are rudely sculptured. During the Gothic period fonts followed the line of general architectural development. Thus the pedestals in the 13th century are often made up of clustered shafts. Most of the extant font covers in Great Britain belong to the 17th century, but a few very beautiful covers were added to existing fonts during the

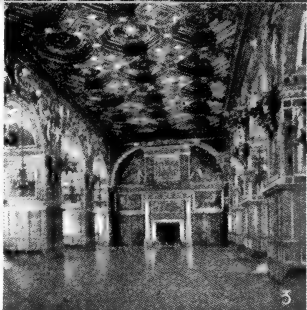


Font. 1. Carved Norman example in Hereford Cathedral. 2. Font in Henry VII's Chapel, Westminster Abbey. 3. Marble font, 1425-32, with bronze figures by Jacopo della Quercia, baptistery of S. Giovanni, Siena. 4. Marble font, 1546, and bronze cover with statue of S. John Baptist by F. Segala, 1666, S. Mark's, Venice



**Fontana, DOMENICO** (1543-1607). Italian architect. Born at Mili, Lake Como, he studied at Rome, where he obtained the patronage of Cardinal Montalto (Pope Sixtus V), becoming pontifical architect under him in 1585. His works included the Lateran Palace, the N. transept of S. John Lateran, Rome, and the lantern of the main dome of S. Peter's (according to Michelangelo's design). After Sixtus's death, 1590, he became royal architect at Naples, where he built the Palazzo Reale, and where he died.

**Fontane, THEODOR** (1819-98). German novelist and poet. He was born at Neu Ruppın, Brandenburg, Dec. 30, 1819. He first attracted notice by his romantic ballads; later, as novelist, he was known as an uncompromising realist. Some of Fontane's more notable stories were *Vor dem Sturm*, 1878; *Stine*, 1890; *Der Stechlin*, 1899; and *Cécile*, 1900. Having visited Britain three times, he wrote *Ein Sommer in London*, 1854, and in 1860 two vols. of letters and sketches concerning England and Scotland. He acted as war corre-

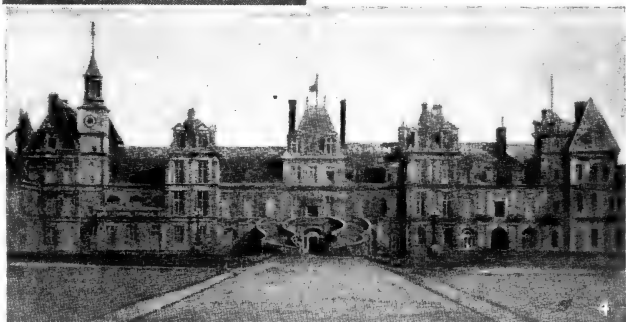


Georgian era. Such is the canopy to the 13th century font at Beverley Minster, which is fashioned in the Renaissance manner with cherub heads and other ornament.

**Fontainebleau.** Town and commune of France, in the dept. of Seine-et-Marne. Lying 37 m. S.E. of Paris on the Paris-Lyons rly., and about 1½ m. from the left bank of the Seine, it is famed chiefly for its palace and for the forest of Fontainebleau which surrounds it. The town has manufactures of porcelain and gloves, paving-stone quarries, and grows a fine type of dessert grapes. A favourite Parisian resort during the summer season, it has an important school of military engineering and artillery. Pop. 14,700.

The palace of Fontainebleau was founded probably by Robert II of France about 998, and rebuilt by Louis VII. His building was demolished by Francis I, who built a new palace on the same site, which was in turn expanded and ornamented by almost each successive monarch, and became the favourite dwelling-place of Napoleon I. It was also much altered and decorated by Louis Philippe between 1837-40. It remains one of the finest buildings in France, no less for its internal than its external and garden beauty. There are four principal courts forming the main structure the Cour du Cheval Blanc, Cour de la Fontaine, Cour Ovale, Cour d'Henri IV. The staircase of Louis XIII, the gallery of Francis I, the banqueting hall, and many paintings and tapestries are notable. The palace has seen many historic events, including the signature of the revocation of the edict of Nantes, 1685, and the abdication of Napoleon I, 1814.

The forest, which is a state property, has an area of some 42,500 acres, and a circumference of nearly 57 m. Its beautiful mixed woods, covering broken and often rugged ground, have attracted many artists to the smaller vil-



Fontainebleau. 1. Napoleon's throne. 2. Bedroom of the Empress Josephine. 3. Gallery of Henry II, or ballroom, 16th century. 4. Cour du Cheval Blanc, where Napoleon bade farewell to men of the Old Guard, April 20, 1814

lages in and near them, notably to Barbizon (*q.v.*). It suffered severely from fires in 1895 and 1911.

**Fontainebleau Sandstone.** Division of the Oligocene system of rocks developed near Paris. It is notable on account of the remarkable purity of the sands, which are composed almost entirely of water-clear quartz, with high silica-content (over 99.65 p.c.), and of great value in glass-making.

**Fontaine Notre Dame.** Village of France, in the dept. of Nord. It is on the Bapaume-Cambrai road, 2½ m. W. of Cambrai. Captured on Nov. 21, 1917, by the British in the first battle of Cambrai, it was recaptured by the Germans in their counter-attack, and finally regained by the British in Sept., 1918. See Cambrai, Battles of.

spondent in the Slesvig-Holstein campaign and in the Franco-Prussian War. He published his autobiography in 1898, and died at Berlin, Sept. 20, 1898. See Theodor Fontane: A Critical Study, Kenneth Hayens, 1920.

**Fontanelles** (Fr., little fountains). Soft spaces present in the skull of the infant. The anterior fontanelle, the largest, is a quadrilateral area occupying the place where later the angles of the two frontal and the two parietal, or side, bones of the head will unite. The posterior fontanelle lies between the posterior angles of the parietals and the occipital bone which forms the back part of the skull. The lateral fontanelles, two on each side, are small and irregular in shape. The anterior fontanelle



does not completely ossify until a year or more after birth; the others close shortly before or after birth.

**Fontanes, LOUIS, MARQUIS DE** (1757-1821). French politician and poet. Born at Niort, March 6, 1757, he was prominent as a journalist during the Revolution. Later he became an ardent supporter of Napoleon, but ultimately went over to the Bourbons. His poetry belongs to the classic school, but is not lacking in premonitions of romanticism. He died in Paris, March 17, 1821.

**Font de Gaume.** Palaeolithic cave, 165 yds. long, in Dordogne, France. It contains many mural paintings, monochrome and polychrome, of the Magdalenian period, some of them masterpieces of prehistoric art. The bison, horse, reindeer, mammoth, and rhinoceros are depicted, besides a human face and hands, and designs of huts.

**Fontenay le Comte.** Town of France, in the dept. of Vendée. It stands on the river Vendée, 30 m. from La Rochelle. The chief buildings are the churches of Notre Dame and S. Jean, and there are also some fine old houses. There are some manufactures, and also a trade in horses, cattle, and agricultural produce, the fairs being important. An old town, Fontenay was in Poitou during the Middle Ages. A fortified town, it was several times taken and retaken, and there was also fighting here during the Revolution. Pop. 9,750.

**Fontenay-sous-Bois.** Town of France, really a suburb of Paris. In the department of the Seine, it is 5 m. from the capital, with which it is connected by tramways. It lies to the N.E. of the Bois de Vincennes. Market gardening em-

plays many of the inhabitants, but the town is chiefly residential. Pop. 15,200.

**Fontenelle, BERNARD LE BOVIER DE** (1657-1757). French author and academician. He was born at Rouen, Feb. 11, 1657, living there till 1687, when he went to Paris, where he remained till his death, Jan. 9, 1757. His best work is to be found in his books of popularised science, *Entretiens sur la Pluralité des Mondes*, 1686, and *Histoire des Oracles*, 1687, and in his eulogies on deceased members of the Academy. His plays were failures, and his *Poésies Pastorales*, 1688, have little merit.

**Fontenoy, BATTLE OF.** Fought May 11, 1745, between the British, Dutch, and some Germans on the one side and the French on the other. The Allies' object was to relieve Fontenoy, a fortified village about 5 m. S.E. of Tournai, Belgium, then besieged by the French.

The French under Marshal Saxe were drawn up across the road from Mons along which, coming from the S., the Allies had to advance. Obstacles had been placed in front, while on their right was the Sambre and the fortified village of Antoing; on their left was the wood of Barri. The Allies under the duke of Cumberland arrived before this strong position on the 10th, and early on the 11th were ready for battle. Allied attacks were repulsed, the Dutch in the centre failing to take Fontenoy.

After some delay the British and Hanoverian infantry made their advance. Lord Charles Hay of the Guards greeted the enemy with lively taunts, and the two lines opened fire. At closer quarters the fight was continued, and the

cavalry were drawn into it. The British and Hanoverians had closed into a square, but after repelling the first attacks they were at length overwhelmed in the general mêlée. More French infantry were brought up; the artillery fire became more intense, and, most vital of all, a brigade of Irish bore down upon the Allies. The square was broken, but they withdrew from the field in good order, although they left behind some of their guns. The losses were about equal, something like 7,000 on each side. The British and their allies had about 45,000 men engaged; the French somewhat more. A monument at the village commemorates the Irish brigade.

**Fontesvilla.** Township of Portuguese E. Africa, in the territory of the Mozambique Company. Now known as the Ponte do Pungue, it stands near the mouth of the Pungue river, 36 m. N.W. of Beira, and is served by the Beira-Mashonaland Rly. The Pungue river is here crossed by a rly. bridge about 420 ft. long.

**Fontevrault** OR **FONTEVRAUD** (Well of S. Errault). Town of France, in Maine-et-Loire dept. It is on the Vienne, 10 m. S.E. of Saumur. Here, in 1099, Robert d'Arbrissel (1047-1117) founded a great Benedictine abbey and an order after which it was named. The abbey, which at one time housed 300 nuns and 200 monks under the rule of an abbess, existed down to the time of the Revolution. The church, consecrated by Calixtus II in 1119, contains recumbent statues of Henry II of England and his queen Eleanor of Aquitaine, Richard Coeur de Lion, and Isabella of Angoulême, widow of King John. In 1804 the



Fontenoy. The French and the Allies confronting each other before the battle. From a painting by F. Philippoteaux  
South Kensington Museum

abbey buildings were converted into a prison. In 1910, when the abbey church was restored, the tombs of Henry II of England, his wife Matilda, and his son Richard I were discovered. See Fontevrault, son Histoire et ses Monuments. L. A. Bosseboeuf, 1890.



Fontevrault. Opened vaults in which the remains of two English kings were discovered in 1910

**Fonthill** or **FONTHILL GIFFARD**. Parish and village near Hindon, Wiltshire, England, 1 m. N.E. of Hindon. William Beckford (*q.v.*), who settled here in 1796, built Fonthill Abbey at a cost of over £250,000, and disposed of it and the greater part of its contents in 1822 for £330,000. A second Fonthill Abbey was built on the same site by the 2nd marquess of Westminster. The church of Holy Trinity, built 1866, replaced that erected by Beckford in 1748.

**Fonvielle**, **WILFRID DE** (1824-1914). French aeronaut and author. Born in Paris, July 24, 1824, he early showed a genius for mathematics, and became a teacher. His opposition to Louis Napoleon during the revolution of 1848 caused his banishment to Algeria after the *coup d'état* of 1851, but he returned at the amnesty (1859), engaged in politics, and studied aeronautics. His two days' balloon ascent of 1868 inaugurated a series of ascents, in many of which he was associated with Tissandier. During the siege of Paris, 1870, he made his escape in a balloon, and went to London, where he gave political lectures. He died April 29, 1914.

**Foochow** or **FUCHOW**. Treaty port of China, capital of the prov. of Fo-Kien. It stands in a plain surrounded by hills on the river Min, 36 m. from its mouth. The



Foochow. General view of the town and river Min, from above the European quarter on the island of Nan-tai

town is enclosed by old and crumbling walls, pierced by seven gateways crowned by towers. The suburbs lie outside the walls, and are almost as extensive as the town itself. The river is spanned by the bridge of Ten Thousand Ages, which is supported by stone pillars, and is a marvellous example of Chinese engineering; it connects with the island of Nan-tai, the European quarter. The bridge is

supposed to be over 800 years old. There are shipbuilding yards, an arsenal, a dry dock, numerous wharves, and a school of navigation. The leading industries are connected with cotton goods, timber, tea, paper, matches, spices, cereals, and ores, while there is a large trade with Japan and the maritime provinces of China. Foochow was opened to foreign trade in 1842. Pop. 624,000.

## FOOD: ITS VARIETIES AND VALUES

W. A. Brend, M.D., Author of *Health and the State*

*The article Diet deals with another aspect of this question. See also Butter: Cheese; Mutton; Pork, and the articles that follow on Food Inspection and Food Control; Digestion*

Food is the term applied to the nutritive matter taken by animals of all kinds to sustain life. The various classes of food vary very much in their constituents and in their value as nourishment. The principal nutritive constituent of meat is protein, the percentage varying in different kinds of meat, and also with the amount of fat. The percentage composition of lean beef, according to Bischoff and Voit, is as follows:

Protein .. .. .	18.4
Gelatin .. .. .	1.6
Fat .. .. .	0.9
Extractives .. .. .	1.3
Ash .. .. .	1.3
Water .. .. .	75.9

In bacon, on the other hand, there is 65 p.c. of fat, and only about 8 p.c. of protein. The digestibility of meat on the whole is lessened by cooking, hence underdone meat is often the most appropriate form for dyspeptics. The breast of chicken is the most digestible form of meat. Veal is not so digestible as beef or mutton, and pork is still less digestible. Tripe is a valuable, readily digested food. Gelatin is not capable of forming new tissues, but is a source of heat and energy.

In fish the chief nutrient con-

stituents are protein and fat, which vary largely in amount and proportion in different fish. Boiled herring contains about 26 p.c. of protein and 10 p.c. of fat, eels contain 17 p.c. of protein and 17 p.c. of fat, mackerel about 17 p.c. of protein and 7 p.c. of fat, cod 22 p.c. of protein and 0.3 of fat.

Thin soups, beef-tea, meat extracts, and similar preparations contain chiefly the flavouring constituents of meat, and very little nutritive material. They possess dietetic value, inasmuch as they stimulate the flow of the gastric juices, and experience has shown that a warm drink containing a meat extract possesses a certain amount of stimulating power when a person is fatigued and cold. The average percentage of composition of milk is as follows:

Water .. .. .	87 to 88
Protein .. .. .	3 to 3.5
Sugar .. .. .	4 to 5
Fat .. .. .	3.5 to 4.5
Mineral matters .. .. .	0.7

We see from this table that milk contains a certain amount of all the essential constituents. It is easily digested, and is therefore appropriate for invalids, for whom it may often with advantage be diluted with lime or barley-water.

Milk straight from a healthy cow is a sterile fluid, but during the process of transit and distribution from the country to the town consumer, there is considerable risk of it becoming contaminated with dirt and, in unsanitary surroundings, infected with micro-organisms. Milk may thus spread epidemics of diphtheria, typhoid, and other diseases. It can be sterilised by boiling, but this tends to diminish its nutritive value. Pasteurisation, by which the milk is kept at a temperature of about 70° C. for 20 to 30 mins., destroys most forms of bacteria, but is not so certain a method of sterilisation as boiling.

Cream and butter constitute easily digested forms of fat. Margarine is prepared from animal fat, and from vegetable fats derived from nuts and seeds. It contains 82 p.c. of fat, and is an excellent digestible nutrient substitute for butter. It is considerably cheaper than butter, and there are no scientific grounds for popular prejudice against its use. Cheese consists chiefly of the casein and fat of milk. It is highly nutritive but somewhat indigestible, and not suited therefore to persons with dyspeptic tendencies.

The constituents of eggs are as follow :

	Water	Protein	Fat	Other Non-nitrogenous Matter	Mineral Matter
White .. .. .	85.7	12.6	0.25	—	0.59
Yolk .. .. .	50.9	16.2	31.75	0.13	1.09

Eggs are highly nutritive, and are most digestible when lightly boiled.

Vegetable foods contain a large proportion of carbohydrates, usually present in the form of starch or sugar. They contain a little protein and fat.

A grain of wheat consists of a minute germ or embryo, which would eventually grow into a new plant; a kernel or endosperm, which makes up 85 p.c. of the grain, and consists of nutritive material for the growth of the young plant; and bran, the outer protective covering of the grain, which consists mainly of cellulose. The process of grinding or milling is to reduce the grain to flour before it can be made up into bread. The germ, which is tough, does not become broken up, but is flattened out by rolling, and is subsequently removed as "offal," and the outer coat is removed as "bran," "sharps," and "middlings," the "flour" being derived only from the endosperm. Different forms of flour are obtained from different layers of the en-

dosperm, some being richest in starch ("whites"), while others ("seconds") contain a higher percentage of gluten, a protein found within the endosperm. In some flours, special processes are employed by which the germ is retained and the nutritive value of the bread increased; in others, certain nutritive elements in the bran are also extracted. Flour, mixed with water and baked, forms ship's biscuit. This, however, is hard, difficult to masticate, and not very digestible. By fermenting dough with yeast, gas is developed in the mass, and thus the bread when baked is light and spongy in texture, and much more readily digested. The percentage composition of wholemeal and white-meat bread, given by Robert Hutchison, is as follows :

	White	Wholemeal
Water .. .. .	40.0	45.0
Protein .. .. .	6.5	6.3
Fat .. .. .	1.0	1.2
Starch, sugar, and dextrin .. .. .	51.2	44.8
Cellulose .. .. .	0.3	1.5
Mineral matter .. .. .	1.0	1.2

The digestibility of bread depends to a considerable extent upon the completeness with which it is chewed and ground up, so as to be easily acted upon by the saliva and other digestive juices in the alimentary canal. Bread is not

so easily chewed when moist; hence new bread is less digestible than stale bread, and toast is more easily digested than ordinary bread. Bread is a highly nutritious but by no means perfect food, since it contains so small a proportion of protein.

Of other cereals, oats are rich in nitrogenous matter, and particularly rich relatively in fat. The husk of oats, however, is not easily removed completely from the kernel; hence, oatmeal is apt to contain a good deal of cellulose, which may act as a stimulant to the intestine where the movements of the bowel are sluggish, but is apt to be irritating to some persons. Oatcake eaten with butter, and porridge with milk, make valuable and nutritious foods. Maize also is as nutritious as wheat, and richer in fat. Meal made from maize is highly nutritive and economical. Barley is rich in mineral matter, but comparatively poor in protein. It contains little gluten, and hence does not make good bread, but, when mixed with

half its weight of wheat flour, can be made into good loaves. Rice is poor in protein, fat, and mineral matter. It contains little cellulose, and for this reason is very completely absorbed in the intestine, which renders it a valuable form of food in some diseases.

Peas, beans and lentils are rich in nitrogenous material, 95 p.c. of which is in the form of protein. They contain a large amount of carbohydrate, but are poor in fat. The nutritive value of these foods is high, but they are not readily digested. Potatoes are very rich in starch, and are most digestible when eaten in the form of a purée. Green vegetables, such as cabbage, spinach, etc., contain only a small proportion of nutritive material, but play an important part in digestion, in stimulating the intestinal movements, and also are valuable as a source of mineral salts.

Some fruits, such as bananas, dried dates, prunes, currants, and raisins, contain a considerable amount of carbohydrate, mostly in the form of fruit sugar. They are of value owing to the presence of mineral constituents. Nuts are of very considerable nutritive value, but are not readily digested.

Besides the essential foodstuffs described above, certain other bodies, which occur only in small amounts, are necessary in order to maintain health. These substances, known as vitamins, have not yet been fully investigated. There are, however, several different forms of vitamins, and it is the absence of these bodies which gives rise to scurvy, beriberi, and possibly rickets. The vitamin which prevents scurvy is particularly abundant in fruit juices and green vegetables. The vitamin which prevents beriberi occurs in the pericarp of rice. Wheat, eggs, and other food contain varying amounts of vitamins. These substances are destroyed or rendered less active by boiling or preserving food; hence the importance of a certain amount of uncooked food, in the form of fruit or vegetables, in the diet. See Food and the principles of Dietetics, Robert Hutchison, 4th ed. 1916.

**Food, INSPECTION OF.** Purity of the food supply is of manifest importance to the well-being of a community, and the duty of looking after this aspect of the public health plays a great part in the activities of various government departments. In the United Kingdom there is a regular system of administration in food inspection duties which begins with Parliament and ends with a local

inspector in a town or county. The duties and powers of those appointed to look after food inspection are laid down in various Acts of Parliament, and administered in the first place by the ministry of health and the Scottish board of health.

The ministry of health for England and Wales may be taken as the typical department responsible for this phase of public health work. It has a chief inspector of foods, who is responsible for administration. Under him are a number of other inspectors, medical men, largely travelling inspectors, whose duty is to keep in touch with the different parts of England. They also supervise the inspection of foreign foodstuffs arriving at different parts. All these officials report to the chief inspector of foods, who in his turn reports to the head of the department. Then, outside the Government share of the work, there is the whole army of public health and sanitary officials employed by counties, towns, or other administrative areas.

In a large town the official responsible to the corporation for the inspection of food is the medical officer of health, or, by arrangement, the chief sanitary inspector. With him will be possibly a qualified veterinary surgeon, who inspects particularly the abattoirs, dairies, cowsheds, meat, and milk. In addition there will be a staff of expert food inspectors, who visit the various food shops periodically, take samples for analysis, and report on the general conditions of their area. In a smaller town, all these multifarious duties are supposed to be carried out by the medical officer of health. Large cities have a specially appointed analyst for checking adulteration of foodstuffs, and, in smaller towns or scattered areas, a number of local authorities may combine in order to secure the services of one analyst between them. In this way there is a fairly thorough inspection of all the different kinds of foods throughout the whole country.

#### Imported Foodstuffs

Special attention is paid to imported foodstuffs. Food inspection at the ports is under the supervision of the medical officer of health of the port in question, who is assisted by other expert technical inspectors. It is their business to see, not merely that all foods arriving in this country are in a condition fit for human consumption, but also that only such foodstuffs come in as are permitted by the foreign meat regula-

tions and other laws affecting imports. In this latter part of their work the food inspectors are assisted by H.M. Customs.

A food inspector, apart from the heads of departments, who are usually qualified medical men or veterinary surgeons, requires a special training. The royal commission on tuberculosis recommended in 1898 that no person be permitted to act as a meat inspector until he had passed a qualifying examination before such authority as may be prescribed by the local government board or the board of agriculture. As a matter of fact, in recent years all inspectors in important districts have been required to pass the examinations of one or other of the institutions which teach for this purpose.

Apart altogether, however, from his technical training, the food inspector must have certain qualities, without which he is useless. Outstanding amongst these is that of transparent honesty. Acting in the interests of the public as he does, he must be fair to the consumer, producer, and vendor, and for this reason it is extremely important that the food inspector should be a whole-time official.

#### Statutory Powers

Before the Great War the inspection of food in the United Kingdom was carried out under certain statutory powers comprised chiefly in the Public Health Act, 1875; the Public Health Acts Amendment Act, 1890; the Public Health (London) Act, 1891; the Sale of Horseflesh Regulation Act, 1899; the Markets and Fairs Clauses Act, 1847; the Towns Improvement Clauses Act, 1847; and the Foreign Meat regulations. These various Acts or sections of Acts set forth the statutory powers of local authorities, medical officers, and inspectors, as well as dealing with definitions and the procedure in courts.

In addition, a considerable number of Acts have been passed with reference to the adulteration of food. They are especially the Bread Act, 1836; the Sale of Food and Drugs Act, 1875, amended in 1879 and 1899; the Margarine Act, 1887; the Butter and Margarine Act, 1907; the Public Health (Regulations as to Food) Act, 1907; and the regulations as to unsound food and foreign meat.

It should be mentioned that it is no part of the duty of a medical officer of health to make analyses of food or of drugs in order to detect any adulteration that may be present. He may be appointed by

a local authority for this purpose, or they may appoint the inspector of nuisances as an inspector under the Sale of Food and Drugs Acts, and this is not infrequently done. As a rule, however, all the analyses for local authorities are carried out by borough or county analysts appointed for the purpose.

During the Great War a large number of orders were issued by the ministry of food, all of which superseded, as long as they were in existence, the operation of the various Acts mentioned above, so far as the special foodstuffs dealt with were concerned. These orders, however, mainly dealt with questions of prices, or methods of distribution, and not as a rule with quality, so that they did not materially affect the duties of food inspectors as before defined.

#### Foreign Systems of Inspection

In most civilized countries food inspection proceeds very much along the lines indicated above. The U.S.A. have a very thorough system of meat inspection, termed the federal meat-inspection service. The inspectors must complete a three years' course at a veterinary college, and the meat inspector is required, in addition, to be an expert in pickling, salting, smoking, and otherwise curing meat. Experienced inspectors travel through country districts and submit their reports to Washington. In addition, the various States issue their own regulations under their health departments.

In the British colonies and dominions a similar system is in force to that of the mother country, but in addition special veterinary inspectors are appointed to examine all the carcasses in the great freezing works, such as those of New Zealand and Australia, and every carcass coming into Great Britain bears a ticket upon which is the name of the inspector who examined it. In France veterinary supervision of abattoirs dates from 1882, and is now under the general supervision of the ministry of agriculture. In Germany, where tuberculosis in cattle is extremely common, the meat-inspection law obtains throughout the empire, and covers even the smaller slaughterhouses. In Scandinavia, Denmark, and Holland meat inspection is very carefully carried out by well-trained officials.

G. Leighton, M.D.

*Bibliography.* The Meat Industry and Meat Inspection, Leighton and Douglas, 1910; The Food Inspector's Handbook, F. Vacher, 1913; Bell's Sale of Food and Drugs, C. F. Lloyd, 1914; Practical Meat and Food Inspection, W. Robertson, 1908.

**Food Control.** Organization and husbanding of supply and an equitable distribution of essential foods. The outbreak of the Great War involved all the Powers engaged in serious difficulties with regard to food supplies. As the Allied blockade proved more effective, it became clear that Germany and Austria must depend on their internal resources, and that these, insufficient even to meet a normal demand, must inevitably diminish as time went on. As early as 1916 central offices existed for their effective control.

As soon as scarcity developed, it became extremely difficult to induce the peasants to part with the food they produced, and in spite of the most drastic administrative measures the German country districts fared better than the towns. Milk was throughout the war an urgent problem, the farmers being reluctant to submit to strict rationing of that commodity and to regulations that laid down the proportion that might be converted into butter and cheese.

In Britain the problem was different, because that country depends more on imported foods. Increase in the area of arable land and close supervision of agriculture with a view to increased production were an essential part of policy, but the real danger was that the submarine campaign might cut the country off from overseas supplies. The first crisis arose in connexion with sugar. The production of beet sugar in Germany, Austria, Russia, and other countries to a large extent ceased, thus making Britain and the importing countries almost entirely dependent upon cane sugar. A sugar commission was therefore formed for its collective purchase. National security depended on bread, and the responsibility for the purchase of wheat, flour, and other essential cereals was placed upon the royal commission on wheat supplies, which bought in the country of origin.

#### The Submarine Campaign

As the submarine campaign developed, the situation became more grave. Ships had to be used as economically as possible, and it gradually became a question of limiting the import of foodstuffs to essentials, and of buying food from the nearest sources. Thus, on account of the shortness of the journey many foods had to be purchased from America which could have been more economically purchased in Australia and New Zealand, and Australian wheat, purchased by the Government, remained on the quays at Sydney. This position only developed

slowly, and it was not until the end of 1917 that drastic steps for the control of food were taken.

A food controller, with extensive powers under the Defence of the Realm Act, was appointed at Christmas, 1916, but the main energies of his department were at first devoted to exhortations to economy. By the following summer it was evident that more was required, and Lord Rhondda took office with instructions to tackle the question at the root.

The fundamental principles on which he worked formed the basis not only of his own policy but of that of his successors. They were: (1) to secure essential bulk supplies, if necessary by Government purchase; (2) to secure priority of tonnage for essential foods; (3) to prevent an undue rise in prices by fixing maximum prices at each stage between the producer or importer and the consumer of all essential foodstuffs, allowing a reasonable profit based on pre-war figures to producers and distributors; (4) the elimination of speculators and unnecessary middlemen, and the supervision of local distribution by local authorities.

#### Securing Supplies

The first and most urgent question was the securing of sufficient supplies, leaving a margin for accidents, such as the sinking of a food cargo or the destruction of a food store by aircraft or by fire. Then the price paid overseas for these supplies had to be kept down in spite of feverish bidding from other countries. Happily the American food administration was very efficient, and by its efforts American production was enormously increased. The British Government themselves purchased Australian and New Zealand meat, the greater part of which was used for the army and navy, and at one time took the whole output of New Zealand butter and Canadian cheese, handing over the quantities not required for the forces for distribution to recognized traders. The purchase of wheat and sugar by the wheat and the sugar commissions steadied markets and ensured supplies. The board of trade bought meat and cheese for the army and navy. The oilseeds trade was organized so that, although a large proportion of the small amount of margarine consumed had previously been imported, it was possible to provide a full ration of home-produced margarine.

All this necessitated some restrictions on traders, most of whom were licensed by the ministry of food and had to act under orders. There were two possible

methods: (1) to set up a bureaucratic control regulating every detail of import or purchase and distribution; (2) to constitute trade organizations representing various sections of the trade, and to entrust the carrying out of the necessary regulations to trade committees. The latter method, or a compromise between the two, was adopted as the exigencies of each case dictated. Generally speaking, it was found that the price to the consumer could not be regulated without having some form of control reaching back to the original sources of supply.

#### Government Purchase

This was the reason for the Government purchase of some foods, and the unified purchase of others by trade committees acting under Government instructions. For the very extensive purchases made in the U.S.A. it was found necessary to set up Allied commissions for buying to prevent the forcing up of prices by Allied bidding, and to meet the difficulty of financing purchases in America.

But the world shortage of sugar made the continuance of sugar control essential, and the world supplies and price of wheat made it necessary to continue this control also. In the case of wheat, the imported price had risen from 36s. 4d. in 1912 to 55s. or 60s. in 1920; while home-produced wheat, ordinarily sold at about 2s. below imported wheat, stood at over 70s. In 1917 the loaf was artificially retained at 9d. for political reasons at the cost of a subsidy varying from 30 to 50 millions sterling. It was therefore impossible to relinquish the control of wheat and of wheat supplies unless the Government were prepared to see the loaf rise in proportion to the price of wheat. In April, 1920, this subsidy was reduced, not abolished, and after that date bread was not subject to a controlled maximum price. The result was the 4 lb. loaf costing 1s. In October, 1920, the subsidy was further reduced, thus raising the cost of the loaf to 1s. 4d. In Dec. the price was reduced by ½d.

In Germany and Austria extreme scarcity had brought into being an army of people who made it their business to evade the food regulations. In the United Kingdom the numerous rules and regulations were, on the whole, faithfully observed, and food remained accessible to the poor. In France there was not the same willingness on the part of merchants, shopkeepers, and the general public to submit to regulations, so control was less effective. See Rationing.

Margaret Bryant



**Food Controller.** Name given in Great Britain to the official responsible for carrying out the Government's scheme to exercise control over the food supplies. The post was created by the exigencies of the Great War, and something of the kind existed in Germany and other countries besides Great Britain. From Dec., 1916, to June, 1917, Viscount Devonport was the controller. He was succeeded by Lord Rhondda, who occupied the position until his death in July, 1918, when J. R. Clynes (*q.v.*) was appointed. He held it until Nov., 1918, and was succeeded by G. H. Roberts, who was, in turn, succeeded by C. A. McCurdy, March, 1920. His department was known as the ministry of food, which was wound up in March, 1921.

**Food Preservation.** Food that is preserved in some manner or another enters very largely into the dietary of modern civilized communities. Doubtless for ages past there have been methods on a small scale of preserving food, used chiefly by those who produced it in order to tide them over the winter seasons.

Modern bacteriological knowledge has revealed the meaning of putrefaction and decomposition, and the secrets of the life histories of the organisms upon which these processes depend. By taking steps to prevent those conditions being present, the organisms themselves cannot live. For example, if a fresh potato be sliced and the slices left open in an ordinary atmosphere, in a day or two the surface of these slices will become mouldy from the growth of an organism, and the potato as a food-stuff will be rapidly spoiled. This mouldiness is the growth of a living organism, which for its success in life depends upon the presence of moisture and a favourable temperature. If, then, the sliced potato is treated in such a way that all the moisture or water is driven out of it, and it is then packed in a tin hermetically sealed so that no moisture or organism can gain access to it, there is no apparent reason why that potato should not keep indefinitely.

As a matter of fact that actual process is carried out, and sliced dried potatoes prepared in Great Britain have been sent to British troops all over the world, to be eaten, after having been resoaked, as still fresh potatoes. In the same way a very large quantity of fish is preserved by drying. The fish are cleaned, the heads removed, they are exposed either to the sun or to artificial heat, packed so that

they are kept dry, and sent thousands of miles, perhaps, before they are consumed. Organisms of decay cannot flourish in low temperatures. If a sheep, therefore, be killed in New Zealand and subjected to a process of freezing while still fresh, it can be sent all over the world in that fresh condition so long as it is kept cold enough.

#### Borax and Boracic Acid

There are various substances which can be added to foodstuffs without injuring their nutritive properties, to preserve them from decay. Salt or saltpetre enter into many forms of pickling solutions. But by far the most important of the chemicals used in this way is boracic acid, or borax, which fulfils the requirements of a food preservative, in that while it possesses distinct antiseptic properties it can be consumed by human beings in small quantities without harm. A half p.c. solution of boracic acid is as effective from a preserving point of view as a 4 p.c. solution of common salt. Furthermore, it does not unpleasantly affect the taste of the food to which it is added, nor has it any small or other objectionable character. Precisely how much per cent. of borax should be used in this way is a question for experts; but of its general value as a food preservative there can be no question. It has been used for preserving fresh milk which has to be transported a long distance before delivery, but this application is largely being superseded by the process of cooling. Fresh unsalted butter can likewise be treated with borax.

The whole question of food preservatives was carefully investigated by a parliamentary committee, whose report was issued in 1901. This committee recommended that formalin should be absolutely prohibited as a preservative of food or drinks, and that the only preservative which should be lawful for use in cream, butter, or margarine should be boracic acid or mixtures of that with borax. They recommended that the use of copper salts should be prohibited, and that no chemicals should be added to any dietetic preparation intended for infants or invalids. See Canning; Refrigeration.

**Fool** (Lat. *foliis*, wind-bag). Retainer kept in the medieval period, and up to the 17th century, by kings and nobles for their entertainment. He was licensed in the exercise of his antic buffoonery, his fooling and the shrewdness of his tongue, and is scarcely to be differentiated from the jester. Shakespeare's Touchstone (*q.v.*) is the

typical fool. The fool wore a special parti-coloured dress, and a cap shaped like a cock's comb with ass's



Fool. The court fool of ancient times attired in his motley

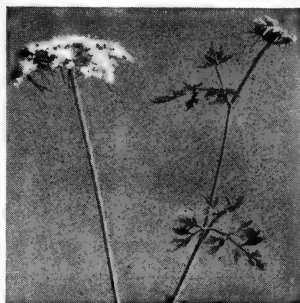
After A. Lambton

ears, and carried a mock sceptre with a fool's head carved on it, and a bladder at the end of a string.

**Fools, FEAST OF.** Medieval burlesque religious festival. A survival of the Roman Saturnalia (*q.v.*), it was originally celebrated on the first day of the year. The Church, although originally opposed to it, eventually allotted special days for its observance. The chief characteristic was at first the inversion of rank. A boy or young man, known by such names as the boy bishop (*q.v.*) or the abbot of unreason (*q.v.*), was chosen to conduct the ritual; but the ceremonies quickly degenerated into buffoonery.

The ass, representing Balaam's ass, the ass which stood by the manger, that on which the Virgin and Child fled to Egypt, or that on which Christ rode into Jerusalem, often played a part. In some places there was a special Feast of the Ass, *e.g.* at Beauvais, where the flight into Egypt was represented by a girl carrying a baby or doll and mounted on an ass, and the priest dismissed the congregation by braying three times, the people responding in the same fashion. The Feast of Fools survived until the Reformation, and as late as 1644 at Antibes in France.

\* **Foolscap.** Properly, the cap worn by fools and jesters, usually conical in shape with bells fastened to it. It is also the common name for a sheet of paper, strictly 17 ins. by 13½ ins., but frequently smaller. This is so called because it had formerly a fool's cap and bells for its watermark.



Fool's Parsley. Leaves and flowers of *Aethusa cynapium*

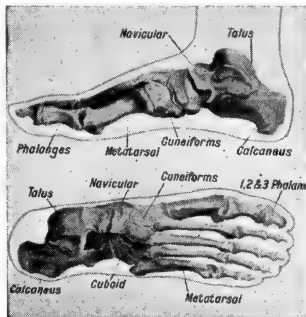
**Fool's Parsley** (*Aethusa cynapium*). Annual herb of the natural order Umbelliferae. It is a native of Europe and Siberia, growing chiefly in cultivated ground. It has a spindle-shaped root and a smooth stem about 2 ft. high. The large, wedge-shaped leaves are much divided into small, thin segments. The minute white flowers are massed in compound umbels. Though somewhat like parsley, it is considered that its nauseous odour would prevent any but "a fool" from being imposed upon by the resemblance.

**Foot.** Lower extremity of the leg on which man stands or walks. The bones fall into three groups: (1) seven forming the tarsus or posterior part of the foot, which correspond to the bones of the wrist; (2) the five metatarsal bones; and (3) the fourteen phalanges, forming the toes. The tarsus consists of the os calcis, which is the largest bone of the foot and forms the heel; the astragalus, which articulates with the tibia and fibula, the two smaller bones of the leg, to form the ankle joint; and five smaller bones—the scaphoid, three cuneiform bones, and the cuboid bone. The metatarsal bones are elongated, and articulate behind with the tarsus and in front with the phalanges.

The phalanges are fourteen in number, three in each of the four outer toes and two in the big toe. The foot is arched in the centre, the posterior pier of the arch being formed by the heel and the anterior by the heads of the metatarsal bones. The dropping of the arch of the foot produces the condition known as flat foot (*g.v.*). Club foot or talipes is a deformity which may be present at birth or acquired during later life. In talipes equinus the heel is drawn up and the patient walks on his toes. In talipes calcaneus the toes are raised from the ground. In talipes varus the foot is inverted, the inner side of the foot being raised, and

the patient walking mainly on the outer side. In talipes valgus the foot is everted, and the patient walks on the inner side. These deformities may be more or less corrected by massage, manipulation, the use of suitable splints or other apparatus, forcible wrenching, and in some cases operation. In claw foot, or pes cavus, there is an increased concavity in the arch of the foot. See *illus.* Ankle.

**Foot.** One of the oldest and commonest measures of length, based upon that of a man's foot,



Foot. Diagrams showing the bones of the human foot, seen from above and from the side

traditionally the king's. The English statute foot is divided into

12 ins. In prosody, foot is the term applied to a group of syllables, one of which is stressed to mark the rhythm that forms a constituent part of a verse.

**Foot-and-Mouth Disease.** Fever mainly affecting cattle, sheep, and pigs, though other animals, including man, are also liable. The disease is only noted periodically in Great Britain, and is then the result of imported infection. When there is an outbreak, the district in which it appears is isolated by forbidding the movement of cattle, sheep, etc., in or out of it, and the affected animals are liable to be slaughtered, compensation being paid.

It is very contagious, spreading from one animal to another and from one place to another with great rapidity, the infection being readily carried by various methods. As a rule, adult animals are not fatally affected, but a large number of the younger ones may die. The cattle, however, lose condition, and the milk must not be sold. The symptoms are those of a fever, with eruptions occurring in the mouth or feet, or both; hence the name. The animal at one stage presents a characteristic appearance in the smacking of the lips, from which a thick discharge issues. See Bacteriology.

## FOOTBALL: ASSOCIATION AND RUGBY

F. B. Wilson, of The Times Sporting Department

This article describes the growth of this popular game and the way its two main forms are played. See also Cricket; Hockey; Rackets; Tennis, and articles on other sports

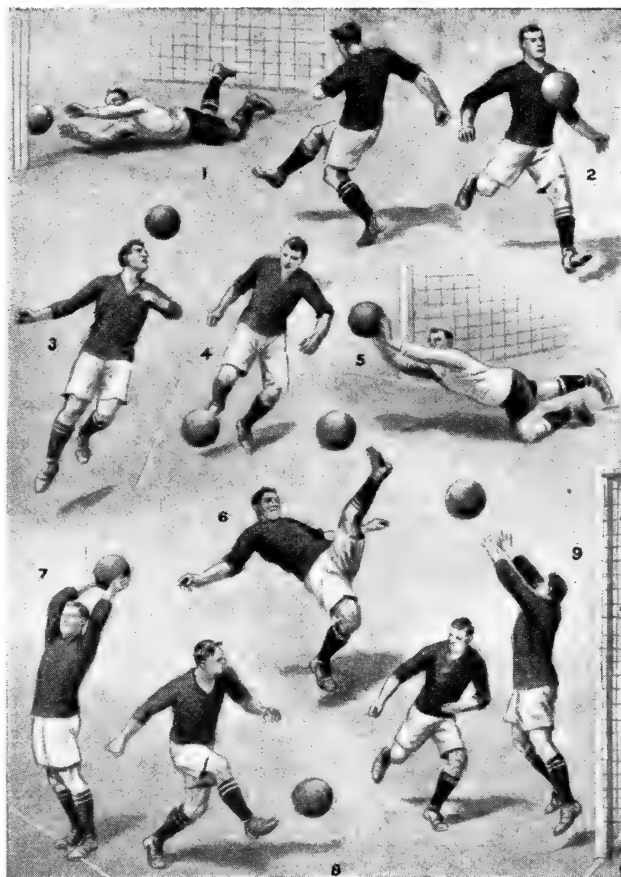
A form of football was known and practised in Derby and Chester as far back as A.D. 217, but in all probability it was then, and for long afterwards, merely an unorganized amusement, indulged in on occasions of public rejoicing by factions, irrespective of numbers, the only object aimed at being the driving of the ball by one faction into a district defended by another.

In the 12th century the game appears to have been an after-dinner diversion of London school-boys. Many proclamations forbidding football were issued in the 14th, 15th, and 16th centuries. In Scotland James III decreed that "football should be utterly cried down." Various municipal authorities continued to legislate against the game, which in those days appears to have been a riot rather than a sport, up to, and possibly later than, 1700. Not until 1800 was any attempt made to limit the number of players, or to secure numerical equality of sides.

For many years football was almost exclusively confined to the

public schools, where the first recorded game took place in 1710. The Rugby game, with its tackling, throwing, and charging, takes its name from the school where it originated, which had a grass field; and the flagged courts of the Charterhouse no doubt brought into existence what afterwards became known as the Association game.

Westminster was probably the first to develop football in an orderly manner. Other schools gradually followed the example, although certain schools still use their own rules. The wall game at Eton would hardly be called football by an outsider. Eton also plays the field game, a hard and very fast game of football which furnishes excellent training for dribbling. Harrow has a game of its own played with a big, clumsy ball like a footstool. Winchester has yet another puzzling variation, in which ropes and netting or "canvas" form a part. Both Eton and Winchester, however, have turned out many brilliant exponents of the Association game.



Football. The Association game. 1. Scoring a goal. 2. Breasting. 3. Heading. 4. Dribbling down the wing. 5. Goal-keeper saving a good shot. 6. Over-head clearance. 7. A throw in. 8. Combination. 9. Punching clear

THE ASSOCIATION GAME. The establishment of something like a regular set of rules for the Association game dates from 1863, when a committee, consisting of representatives of Eton, Harrow, Marlborough, Rugby, Shrewsbury, Westminster, Charterhouse, and other clubs, drew up rules, and from this moment Association and Rugby football were two different games. The rules of the Football Association, which thus came into existence, were brief and simple in character. In 1867 the off-side rule was changed; up to that time it had been virtually the same as it is in Rugby football to-day.

In 1871 a resolution was passed by the Football Association "That it is desirable that a challenge cup should be established in connexion with the Association, for which all clubs should be invited to compete." The Wanderers, composed chiefly of old public school boys, won the cup in

1871-72, 1872-73, 1875-76, 1876-77, and 1877-78. They thus made the cup their absolute property, but returned it to be retained as a perpetual trophy. Later, in 1882-83, and the two succeeding years, Blackburn Rovers won the cup, and they were presented with a special shield by the Association.

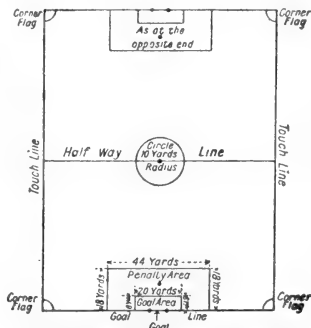
The Wanderers and Blackburn Rovers have each won the cup five times in all. When Aston Villa won it in 1919-20, however, their number of victories was brought up to six. No southern team won the cup after 1882 until 1900-1, when Tottenham Hotspur beat Sheffield United at Bolton, after a drawn game at the Crystal Palace.

In 1873 the Scottish Football Association cup competition was inaugurated, the first winners being Queen's Park, an amateur organization, which has altogether been successful in ten final ties. Their record is almost equalled by Celtic, who have won the cup nine times.

The Welsh Football Association cup, first played for in 1877-78, has been won twelve times by Wrexham and seven times by Druids; and the Irish cup, first competed for in 1880-81, has fallen to Linfield eleven times, while Distillery and Cliftonville have secured it eight and seven times respectively. The Football Association amateur cup, open to all English amateur clubs, dates from 1893-94, in which season the Old Carthusians defeated the Casuals in the final at Richmond by two goals to one.

In 1872 the first official Association international was played between England and Scotland, and ended in a draw. Since then the match has been an annual one, played alternately in Scotland and England, with the exception of one year when it was played at Birmingham instead of in Scotland. During the war the match was discontinued, but it was revived in 1920.

Prior to 1883-84 the England and Scotland match decided the international championship, but in that season Ireland and Wales entered the lists, and the championship is now determined on points, each country meeting the others once, two points being allotted for a win and one for a draw. Scotland have been successful 24 times, England 22, and Ireland and Wales twice each, these figures including ties. International teams are selected from both amateur and professional players, but in recent years they have been almost entirely composed of paid players. International matches restricted to amateurs were instituted in 1906. English amateurs met, in addition to teams chosen to represent Ireland and Wales, several Continental elevens, and almost invariably proved successful. Great improvement has, however, been made by foreign countries since the outbreak of the Great War, as was



Football. Diagram showing lines and dimensions of Association football ground

evidenced in 1920, when Belgium defeated England at Brussels, and again in the Olympic Games the same year, when Norway gained a surprise victory over England.

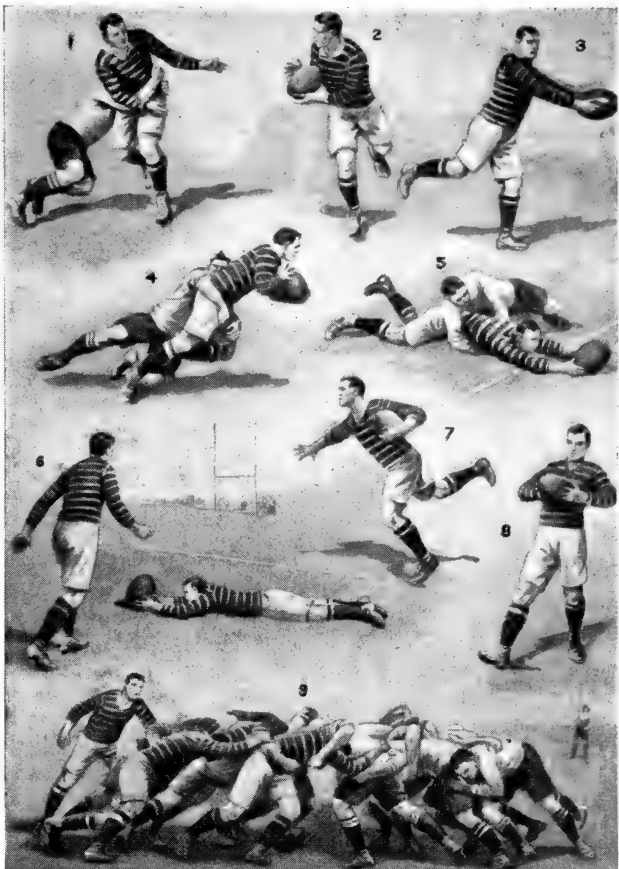
After the inauguration of the Cup and the first international, the popularity of the game increased enormously, and in 1882, to check the increase of professionalism, a new rule was added making it illegal for any player to receive remuneration or consideration of any sort above his actual expenses and any wages lost. In 1885, in spite of much opposition, professionalism was legalised. In 1888 the Football League (*q.v.*) was founded. This was followed by the formation of the Scottish League and the Irish League in 1890, and the Southern League in 1894.

In 1891-92 the first of the inter-league games between the Football League and the Scottish League was played at Bolton, and two years later the Irish League joined in these games. From 1910-11 to 1914-15 all four leagues met in opposition, the Football League and Scottish League each winning two of the contests, and the Southern League the other. The latter took no part in the 1919-20 matches when the Football League headed the table. Among the principal minor leagues devoted to the Association game are the Midland League, Birmingham League, Central League, London Combination, London League, Isthmian League, and Athenian League, the two last named being for amateur clubs only.

In 1900 the Football Association passed a resolution to the effect that wages paid to a player should be limited to £4 a week, or £208 a year. This rule, in spite of great opposition, held good to the season of 1909-10, when it was removed. In 1907 came the unfortunate split which resulted in the formation of the Amateur Football Association as distinct from the Football Association, but in 1914 the dispute was settled and the Amateur Football Association affiliated to the governing body.

As regards the laws of the game, the chief, somewhat abridged, are as follows: The game shall be played by 11 players on each side. These are one goal-keeper, two full-backs, three half-backs, and five forwards, known as outside-right, inside-right, centre, inside-left, outside-left.

The dimensions of the field of play shall be: maximum length 130 yds., minimum length 100 yds., maximum breadth 100 yds., minimum breadth 50 yds. The field of play shall be marked by boundary



Football. The Rugby game. 1. Passing on being tackled. 2. Taking a pass. 3. A drop kick. 4. A tackle. 5. Scoring a try. 6. Place kicking. 7. A dash for a try. 8. Making a mark. 9. A scrum.

lines. The goals shall be upright posts fixed on the goal-lines, equidistant from the corner-flag staffs, 8 yds. apart, with a bar across them 8 ft. from the ground. The circumference of the ball shall not be less than 27 or more than 28 ins. The casing of the ball must be of leather and no material shall be used in its construction which would constitute a danger to the players.

At the beginning of the game the weight of the ball shall be from 13 to 15 oz. The duration of the game shall be 90 mins. unless otherwise mutually agreed upon. The winners of the toss shall have the option of kick-off, or choice of goals. Ends shall only be changed at half-time. The interval at half-time shall not exceed 5 mins. except by the consent of the referee. The goal-keeper may, within his own penalty area, use his hands, but may not take more than two steps while holding the ball. The

goal-keeper may not be charged, except when holding the ball or obstructing an opponent, or when he is outside the penalty area. Tripping, kicking, striking, or jumping at an opponent are not allowed, or the *intentional* handling of the ball. Holding or pushing with the hands is not allowed. Charging is permissible, as long as it is not dangerous.

A referee is sole judge of fair and unfair play, and can award a free kick or a penalty kick for infringement of the rules, and may even order a player or players off the field. In the case of a penalty kick, the ball is placed on a mark 12 yds. from and opposite the centre of goal. All players, with the exception of the player taking the penalty kick and the opponents' goal-keeper, must be outside the penalty area, and the goal-keeper must not come out beyond his goal-line. A free kick is a kick at the ball in any direction a player pleases when

it is lying on the ground. A free kick or a penalty kick must not be taken until the referee has given a signal for the same.

Touch is that part of the ground on either side of the field of play. When the ball is kicked or headed into touch the opposing team is awarded a throw-in. The thrower must keep part of both feet on the touch-line and throw the ball from above his head with both hands from the point on the touch-line at which the ball left the field of play. If the ball be thrown in any other manner it is a foul throw, and the opposing team is awarded a free kick, to be taken from the same point on the touch-line. A goal can be scored directly from a free kick only when it has been awarded for an infringement of law 9, which relates to tripping, kicking, handling, etc. When a free kick has been awarded opponents may not approach within ten yards of the ball before the kick is taken, unless they be on their own goal-line.

#### The Law of Offside

The law dealing with offside is the one most frequently infringed and least understood. A player is onside at all times when there are three or more opponents between him and the opponents' goal-line. A player cannot be offside from a corner-kick, a throw-in (amendment made to law in 1920), a goal-kick from either goal, a backward pass, or when the ball is last played by an opponent. It is important to realize that a player is adjudged on or off side according to his position at the time the ball was last played. Providing he is not attempting to play the ball, or is not in any way interfering with an opponent, a player can be in any position on the playing field and not be ruled offside.

**RUGBY FOOTBALL.** Running with the ball, the distinctive feature of Rugby football, was once unknown at Rugby. It came into vogue as the result of the spirit of enterprise and audacity shown by one William Webb Ellis. In the school play it was customary for a boy, having caught the ball from an opponent's kick, to step back and punt, or drop-kick, or place it for another of his side to kick. In 1823 Ellis astonished his fellow players, after having caught the ball, by running with it in the direction of his opponents' goal. This innovation was not recognized in the school rules until 1841, and then only with certain limitations.

Rugby school boys took their game to Oxford and Cambridge, and also founded clubs. The oldest of these, the Blackheath Club, was founded in 1860. Those were the days of hacking and tripping. The

Blackheath rules stated, "No player may be hacked and held at the same time; hacking above or on the knee, or from behind, is unfair. No player can be held or hacked unless he has the ball in his hands. Although it is lawful to hold a player in the scrumage, this does not include attempts to throttle or strangle, which are totally opposed to the principles of the game. A goal must be a kick through, or over, and between the poles, and, if touched by the hands of one of the opposite side before or whilst going through, it is no goal."

Rugby football found its way to Edinburgh and Glasgow, and in 1873 the Scottish Football Union was founded to encourage football in Scotland, to cooperate with the English Rugby Union, and to select international teams. The Irish Union came into existence in 1874, the Welsh Union in 1880.

Originally there were 20 players a side, and a set of 59 rules was compiled. Hacking and tripping were abolished. A player, being offside, was placed onside when one of his own side had run in front of him with the ball, or kicked it when the offside player was behind him. A try having been gained, the ball was brought straight out from a mark made on the goal-line opposite to the spot where it was touched down. It was also provided that captains should arbitrate on all disputes.

#### Point Scoring in Rugby

In the course of time these rules came to be considerably altered, a system of penalties exacted, and scoring was revolutionised. In the early days a goal beat any number of tries. Subsequently it was resolved that if no goal was kicked a match could be decided by a majority of tries. A system of points was instituted later. The goal kicked from a try (the try not counting) is now valued at 5 points, the dropped goal 4 points, the penalty goal 3 points, the goal from a mark 3 points, and a try 3 points.

In a few years, however, forward play became faster and more open. The arrangement of the backs in the field was altered, the greater part of the offensive work falling upon the half-backs, and of the defensive upon the full backs alone. The original notion was to have only two classes of players behind the scrumage, half-backs and backs, there being two half-backs, three backs, and ten forwards. The earliest development of the game was to put the centre back in front of the two backs at the sides to enable him occasionally to get away on a run after a

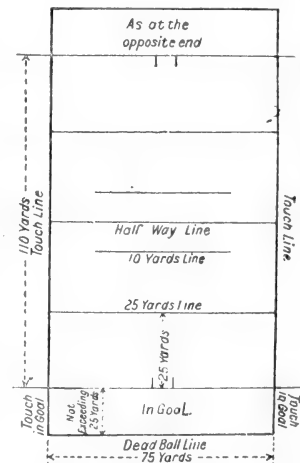
drop kick from the back ranks of the other side.

Forwards continued to shove vigorously, while the backs had the more showy part, the running and tackling. Half-backs of fine individual powers came on the scene, and meanwhile captains had begun to realize that more was required from forwards than mere shoving. In 1832 H. Vassall introduced running and passing among the Oxford forwards. From that time the game became more and more open. A further alteration was made in the composition of the side, and the new placing consisted of one full back, three three-quarters, two half-backs, and nine forwards. Wales, pursuing the principle of running and passing, tried the experiment of only eight forwards, putting the extra man in the three-quarter line, and this innovation became general.

#### International Matches

The first international match was played between England and Scotland at Edinburgh in the season of 1870-71, and was won by Scotland by a goal and a try to a try. The first match between England and Ireland was played at the Oval in 1874-75, and won by England by 2 goals and a try to nil. The first international between England and Wales took place at Blackheath 1880-81, and won by England by 8 goals (one dropped) and 6 tries to nil. The first international between England and France was played in Paris, in 1905-6, and England won all the ten matches played to 1919.

The series of matches between England and Scotland was interrupted in the season 1884-85, owing to a dispute over a try scored by



Football. Plan of Rugby football ground



R. S. Kindersley in the match of the previous year. Again, owing to a controversy, no matches were played between England and Scotland in the seasons 1887-88, 1888-89. The controversy occurred with regard to the constitution of the international board. After considerable negotiation in 1890 an international board of twelve representatives, since reduced to 10, four from the English Rugby Union, and two each from the Scottish, Irish, and Welsh Unions, was set up:—(i) To frame the laws for international matches. (ii) To settle all questions connected with, or arising out of, an international match, but without jurisdiction over the game as played in the separate countries.

After this the question of money began to creep in. In Yorkshire and Lancashire the game had become a popular spectacle; feeling ran high, aided, as it was, by cup-ties. While old public school boys were content to play for the love of the game, clubs and committees began to hold out certain inducements to promising young players of other classes.

Eventually those who favoured the idea of payment seceded and founded, in 1895, the Northern Union, with a separate code of laws, and a system of scoring different from that of the Rugby Union. For some years Northern Union Rugby was played by 15 a side, but subsequently the sides were reduced to 13. While the new game gained few converts in the south of England, some Australians saw that the Northern Union game, with its spectacular openness, its quickness, and its scope for the individuals, held propositions not to be neglected, and in New South Wales a league plays this game.

#### New Zealand Rugby

Rugby football was degenerating throughout Great Britain, in England especially, when the New Zealand team of 1905-6 came over. They came ostensibly to learn, but from their first match overran even the best club sides. They brought an innovation in the shape of a wing-forward, whose play was merely that of an obstructionist, and against the spirit of the game. The New Zealanders beat Scotland, Ireland, and England, but were beaten by a try to nothing in Wales. A South African team came over in the following year. The South Africans were beaten by Scotland, drew with England, just beat Ireland and beat Wales decisively. These two sides had a great effect on British football.

It was largely in consequence of the lessons learned from the New

Zealanders and South Africans that A. D. Stoop brought a new spirit of football into play, first to the Harlequins, and secondly to England. He brought together enterprise, individuality, and combination, himself setting the example of all three. In the season 1909-10, England beat Wales at Twickenham for the first time in 11 years. Wales kicked off and Stoop caught the ball. Instead of kicking into touch, as had been the custom from time immemorial, Stoop ran with the ball and started a passing movement which resulted in a try for England in the first half-minute.

In 1912-13 the South Africans sent over another team, which won all its internationals. The South Africans were tremendously heavy and fast forward, and wore down every pack they played against.

#### Rugby Rules

The Rugby game should be played by 15 players on each side. The field of play shall not exceed 110 yds. in length nor 75 in breadth, and should be as near these dimensions as practicable. The lines defining the boundary of the field of play shall be suitably marked, and shall be called the goal-lines at the ends, and the touch-lines at the sides. On each goal-line and equidistant from the touch-lines shall be two upright posts, called goal-posts, exceeding 11 ft. in height, placed 18 ft. 6 in. apart and joined by a crossbar 10 ft. from the ground. The object of the game shall be to kick the ball over this crossbar and between the posts. The game shall be played with an oval ball, as nearly as possible 11 ins. to 11½ ins. in length; circumference, 30 ins. to 31 ins.; width (circumference), 25½ ins. to 26 ins.; weight, 13 oz. to 14½ oz.

The following are the chief terms employed in the game. A drop-kick is made by letting the ball fall from the hands, and kicking it as it rises; a place-kick by kicking the ball after it has been placed on the ground for the purpose; a punt by letting the ball fall from the hands and kicking it before it touches the ground; a tackle is when the holder of the ball is held by one or more players of the opposite side so that he cannot at any moment, while he is so held, pass or play it.

A scrummage is formed by the forwards from each side closing round the ball when it is on the ground, or by closing up in readiness to allow the ball to be put on the ground between them. A try is gained by the player who first puts his hand on the ball in his opponents' in-goal. A goal is

obtained by kicking the ball from the field of play by any place-kick except a kick-off, or by any drop-kick except a drop-out, without touching the ground or any player of either side, over the opponents' crossbar, whether it touches such crossbar or either goal-post or not. A kicker and a placer must be distinct persons, and the kicker must not under any circumstances touch the ball when on the ground, even though the charge has been disallowed. A fair catch is a catch made direct from a kick or knock-on, or throw forward by one of the opposite side; the catcher must at once claim the same by making a mark with his heel at the spot where he made the catch.

Free kicks by way of penalties shall be awarded if any player: intentionally either handles the ball or falls down in a scrummage, or picks the ball out of a scrummage, either by hands or legs; does not immediately put it down in front of him on being tackled; being on the ground, does not immediately get up; prevents an opponent getting up or putting the ball down; illegally obstructs an opponent; or wilfully puts the ball unfairly into a scrummage, or the ball having come out, wilfully returns it by hand or foot into the scrummage. The referee shall be sole judge in all matters of fact, but in matters of law there can be an appeal to the union.

#### New Rules Added

At the beginning of the season 1920-21, several new rules were passed by the governing body. The two most important were: that after a try has been scored, and the kick at goal has failed, the game shall be restarted from mid-field instead of being dropped from the 25-yard line; that any player who has made a fair catch must take the resulting kick himself. The first rule neutralises, to an extent, a too heavy wind; the second encourages every individual, and is directed against undue specialising.

See *Corinthian Football Club*, *illus.*

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**Football Association.** Governing body of English amateur and professional association football. It was founded in 1863 to establish a definite set of rules to govern both Rugby and Association football, but at a preliminary meeting the representatives of the Rugby clubs objected to the proposal to make hacking illegal, and withdrew. The F.A. is responsible for all legislation under the dribbling code, and all clubs on its register must abide by its rulings. In 1871 the F.A. promoted a cup competition open to all clubs, and in 1872 sanctioned the playing of international matches. The F.A. was formed into a limited liability company in 1903. Its council consists of the president, six vice-presidents, the hon. treasurer, ten divisional representatives, and one representative of each affiliated association with membership of at least 50 clubs. *See* Association Cup.

**Football League.** Union of Association football clubs for the purpose of playing matches against each other. The main principle is that every club in a league shall play every other club twice during the football season, once at home and once away.

The idea was borrowed from the U.S.A., where it was practised by baseball clubs, and was suggested to certain football clubs by W. McGregor of Birmingham in 1888. The first league, the Football League, was then formed, and consisted of twelve of the leading English professional clubs. Each was to play every other twice during the season; a win was to count two points and a draw one, so a club could make a maximum of 44 points. The club totalling the greatest number of points was declared champion of the League. The number of clubs in the League was raised to 14, 16, 18, 20, and then to 22.

To maintain the high standard of the League clubs a system was adopted by which the four lowest on the list were liable to be dropped in favour of other clubs from outside. The matter being decided by the governing body of the League. In 1892 a second division of 12 clubs, later increased to 22, was added, and, down to 1895, when the number was altered to two, the practice prevailed of the three lowest clubs in the first division playing the three highest in the second for entrance into the former during the following season. These test matches were, however, abandoned in 1898, since when the two lowest clubs in the first division and the two highest in the second division have automatically changed places. At various times proposals were made

for the formation of a third division, and in 1920 it was arranged that the Southern League should become the third division of the League.

**Footboard.** Continuous step running along the side of a rly. carriage a few inches below the floor level. It is also the longitudinal step on either side of a motor-car.

**Footie, SIR EDWARD JAMES (1767-1833).** British sailor. Born at Bishopsbourne, Kent, April 20, 1767, he entered the navy at the age of 12, was in the action on the Dogger Bank, 1781, and at Dominica, 1782. Lieutenant in 1785, he went to the East Indies, was made commander in 1791, and post-captain in 1794. In 1797 he was in the Mediterranean under Sir John Jervis, and the following year served under Nelson, who, in 1799, appointed him senior officer in Naples. Rear-admiral in 1812, he became second in command at Portsmouth in 1814, and vice-admiral in 1821. He was knighted in 1831, and died at Southampton, May 23, 1833.

**Footie, SAMUEL (1720-77).** English actor and dramatist. Born at Truro, 1720, he was educated at



Samuel Footie,  
English dramatist  
*After Sir J. Reynolds*

Worcester College, Oxford. He joined the bar, but gave up a legal career to go on the stage. He was a skilful mimic and brought out at The Haymarket in 1747 a successful entertainment called *The Diversions of the Morning*, in which he burlesqued well-known living persons. The magistrates having prohibited its performance, he defied them by issuing a general invitation to his friends to "take a dish of tea with him," tickets for which could be obtained at George's Coffee House, Temple Bar.

With The Haymarket, rebuilt by him in 1767, he remained connected till 1777, playing many parts and producing there several of his caricature comedies, the best of which are *Taste*, *The Minor*, *The Orators*, *The Mayor of Garratt*, *The Devil upon Two Sticks*, and *The Capuchin*. He died suddenly at Dover, Oct. 21, 1777, and was buried in Westminster Abbey.

**Footpath.** Narrow path, used by pedestrians only. In the United Kingdom the preservation of public



Sir Edward Footie,  
British sailor

right of way over footpaths is a matter of general interest. Such a right is in the nature of an easement. It may be acquired by grant made by some person, such as the freeholder, who had power to grant; or by user. In the latter case, after 20 years' uninterrupted enjoyment, the law presumes a grant made before the user commenced; after 40 years the right is deemed absolute, unless enjoyed by some consent expressed by deed or other evidence in writing.

Obstructions placed in a footpath may be removed by anyone enjoying the right to use it. The safeguarding of the public right to use footpaths is now entrusted to the parish and district councils, without whose consent no public right of way may be diverted or stopped. The right is also made the object of solicitous attention by the Commons and Footpaths Preservation Society, 25, Victoria Street, London, S.W. *See* Commons; Right of Way.

**Footplate.** Metal plate on a locomotive which covers the floor where the driver stands and extends along both sides of the engine and in front of the boiler. It is also a metal floor-plate secured to the end of a railway corridor carriage, which rests and is free to slide upon the end of the next carriage, so as to form a floor to the gangway between the carriages. *See* Steam Engine.

**Foot Pound.** Work done in raising one pound through a distance of one foot in lat. 45° and at sea level. *See* Horse-power.

**Footprint.** Fossil record of the impressions of the feet of extinct reptiles or amphibians. Alluvial deposits must at all periods retain footmarks for a short time; some of these have been accidentally preserved by later solidification of the silt.

**Foot Rot.** Term usually applied to a disease affecting the feet of sheep. The animal suffers great pain from an acute inflammation of certain structures of the foot, caused by a microscopic organism which infects low and damp pastures. The disease is readily noticed, for infected animals adopt a kneeling position when grazing.

Affected animals must be removed at once to a dry yard or shed. Dryness is absolutely essential, and if the animals are allowed to stand for a short time daily on a floor covered with slaked lime, the healing process is considerably hastened. Foot rot is highly contagious, and since it takes three weeks to develop, newly purchased sheep should be kept apart from the rest for twenty to thirty days.

**Foot's Cray.** Urban dist. and parish of Kent, England. One of the four contiguous parishes on the river Cray—St. Mary Cray, St. Paul's Cray, Foot's Cray, and North Cray—it is 2 m. S. of Sidcup station on the S.E. & C.R. Its name is derived from that of its owner in the time of Edward the Confessor, Godwin Foot; but is sometimes found written Votes' and Foot's Cray. N. of the village is the Early English church of All Saints. In the time of Henry VIII Foot's Cray belonged to the Walsingham family. In 1920 the official name was changed to Sidcup. Pop. 8,493.

**Footscray.** Suburb of Melbourne, Victoria, Australia. It is intersected by the Saltwater river, and is 4 m. by rly. S.W. of the capital. There is a dry dock here. Pop. 23,643.

**Foppa, VIN-CENZO** (c. 1425-1516). Italian painter. Born at Brescia, he studied, probably with Squarcione, at Padua. About 1450 he returned to Brescia, but a few years later settled at Pavia. He exercised an enormous influence on the Milanese school, and the best collection of his paintings is at Milan. The National Gallery possesses

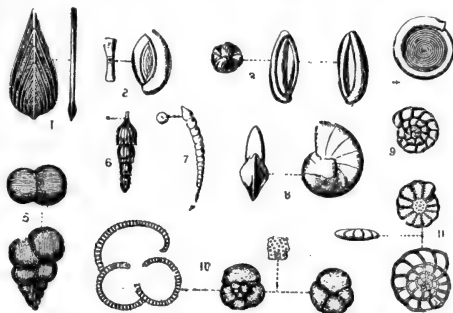
an Adoration of the Magi by him.

**Forage** OR FODDER CROPS. Plants grown for the use of their stems and leaves as provender. Grasses, etc., cultivated for hay or grazing, and such things as kohlrabi and cabbage, are classified as root crops. Forage crops are often taken as catch crops in S. Britain, and may either be cut green or fed on the land. On the whole, they increase fertility and help to keep down weeds, but are only available for a short time. The chief forage crops are cereals and grasses: barley, winter oats, and rye, as catch crops; Italian ryegrass (cut green); cruciferous forms: rape and mustard; leguminous forms: gorse, lucerne, lupins, sainfoin, trifolium, and trefoil. See Agriculture; Crops.

**Forain, JEAN LOUIS** (b. 1852). French artist. Born at Reims, he studied under Gérôme at the Beaux Arts. After contributing to the *Monde Parisien* and other illustrated journals, he expressed his

satirical talent at its best in the *Courrier Français* and *Le Rire*, and later in the *Pastel*, an anti-Dreyfusard sheet founded by himself and Caran d'Ache. He is, above all, the interpreter and castigator, in exquisite draughtsmanship, of the seamy side of Paris life, but his impressionist paintings are interesting.

**Foraminifera** (Lat. *foramen*, small hole). Minute creatures of low organization, belonging to the sub-kingdom Protozoa. Many of them are scarcely visible to the naked eye. Most of them are marine. They secrete a limy or membranous shell, usually perforated with minute holes through which thread-like processes of the body protoplasm can be extruded.



**Foraminifera.** 1. *Frondeularia Goldfussi*, Cretaceous, Bohemia. 2. *Spiroloculina badensis*, Miocene, Baden, Vienna. 3. *Quinqueloculina saxorum*, Eocene, Paris. 4. *Cornuspira polygyra*, Oligocene, Hungary. 5. *Textularia globifera*, Upper Cretaceous, Traunstein, Tyrol. 6. *Nodosaria spinicosta*, Miocene, Vienna. 7. *Dentalina elegans*, Miocene, Vienna. 8. *Cristellaria rotulata*, Cretaceous, Bohemia. 9 and 11. *Rotalia Beccarii*, Pliocene, Siena. 10. *Globigerina conglomerata*, Pliocene, Carnicobar, Bay of Bengal.

With the aid of these pseudopodia (false feet) the animal is able to creep about and to secure the particles of organic matter on which it feeds. The ooze of the ocean beds, and the vast deposits of limestone which form so large a portion of the earth's crust, are largely composed of the dead shells of foraminifera.

**Forbach.** Town of France, in Lorraine. It is 5½ m. S.W. of Saarbrück, and 33 m. E. by N. of Metz. The French were defeated at the battle of Spicheren on the hills near by (Aug. 6, 1870), and the Germans occupied the town. It was returned to France with Alsace-Lorraine in 1919. Pop. 10,100.

**Forbes.** Town of New South Wales, Australia. It stands on the Lachlan river, 290 m. W. of Sydney. It is an important centre of sheep and horse breeding. Pop. 4,654.

**Forbes, ALEXANDER PENROSE** (1817-75). Scottish divine. Born at Edinburgh, June 6, 1817, and educated there and at Glasgow, in 1836 he entered the Indian civil

service. His health failing, he returned to England and won a Sanskrit scholarship at Brasenose College, Oxford. Ordained in 1844, he became in turn incumbent of Stonehaven and vicar of S. Saviour's, Leeds. He was appointed bishop of Brechin in 1848.

A prominent high churchman, he was tried in the ecclesiastical courts on a charge of heresy, arising out of the statement of his views on the Eucharist contained in his primary charge, and was censured. He was the author of numerous commentaries and liturgical works. He died in Dundee, Oct. 8, 1875.

**Forbes, ARCHIBALD** (1838-1900). British war correspondent. Born in Elginshire, April 17, 1838, and educated at King's College, Aberdeen, he broke off his university course to enlist in the Royal Dragoons, and, while still a trooper, contributed articles to the papers. In the Franco-Prussian War of 1870-71 he made his reputation as correspondent, first of *The Morning Advertiser* and then of *The Daily News*. He saw much subsequent service as a war correspondent, notably in the Russo-Turkish and Zulu Wars, being able in the latter to give Britain the first news of the battle of Ulundi. Between campaigns Forbes lectured. He wrote *Memories and Studies of War and Peace*, 1895, and died in London, March 30, 1900.

**Forbes, DUNCAN** (1685-1747). Scottish lawyer. Born near Inverness, Nov. 10, 1685, he studied law



Duncan Forbes, Scottish lawyer

From an engraving

at Leiden, was admitted advocate and appointed sheriff of Midlothian in 1709, and, for his services in suppressing the rebellion of 1715, was made deputy-advocate. Returned to Parliament for the Inverness burghs in 1722, he was appointed lord advocate in 1725 and lord president of the court of session in 1737. In the rebellion of 1745 he strove hard to keep the rebels in check, but his services were coldly received by the Government. He originated the idea of raising Highland regiments, later adopted by Pitt. He died Dec. 10, 1747.



Arch Forbes

**Forbes, EDWARD** (1815-54). British naturalist. Born at Douglas, Isle of Man, Feb. 12, 1815, he was appointed in 1843 to the chair of botany at King's College, London, and became curator of the Geological Society. In 1853 he became professor of natural history at Edinburgh. He is chiefly known by his work on the starfishes, 1841, and British mollusca (with Hanley), 1853. He died near Edinburgh, Nov. 18, 1854.

**Forbes-Robertson, SIR JOHN-STON** (b. 1853). British actor. Born in London, Jan. 16, 1853, eldest son of John Forbes-Robertson, art critic and journalist, of Aberdeen, and educated at the Charterhouse

and Rouen, he studied art at the R.A. school, and elocution under Samuel Phelps. He made his stage debut, March 5, 1874, at The



*J. Forbes-Robertson*

*Downy*

Princess's, London, as Chastelard, in Mary Queen of Scots. In the same year he appeared with Ellen Terry at Astley's. Associated in turns with Charles Calvert, the Bancrofts, Henry Irving, Wilson Barrett, and John Hare, he achieved his first notable success as Geoffrey Wynyard in Dan'l Druce, at The Haymarket, Sept. 11, 1876. His first venture as an actor-manager was at The Lyceum, Sept. 21, 1895, when he appeared as Romeo to the Juliet of Mrs. Patrick Campbell. His farewell season in London was opened at Drury Lane, March 22, 1913, and closed on June 6 following. In this year he was knighted.

Gifted with a magnetic personality and exceptional elocutionary ability, he was one of the most popular actors of his time. Of the many parts he played, his Hamlet, the title-role in *The Passing of the Third Floor Back*, and *Dick Helder* in *The Light That Failed*, were memorable.

He toured in the U.S.A. in 1885, 1891, 1903-4, 1906, 1909-10, 1911, 1914, and 1915; and in Germany in 1898. His brother, whose stage name is Norman Forbes (b. 1859), also won distinction as an actor; and his sister, Frances Forbes-Robertson, was the author of several novels.

In 1900 Sir Johnston married May Gertrude, sister of Maxine Elliott (q.v.) and daughter of Thomas Dermot, of Oakland, California, who, as Gertrude Elliott, made her



Sir J. Forbes-Robertson in character as, left, *The Stranger*, in *The Passing of the Third Floor Back*; right, *Hamlet*

*Lizzie Caswall Smith*

first appearance on the American stage in 1894, and later won much public favour as Peggy, in *Mice and Men*; *Ophelia*; *Desdemona*; *Portia*; *Cleopatra*, in *Caesar and Cleopatra*; *Maisie*, in *The Light That Failed*; *Stasia*, in *The Passing of the Third Floor Back*; and other parts.

**Forcados.** River and town of Nigeria, W. Africa. The river forms the most important deltaic arm of the Niger, discharging into the Right of Benin. Vessels proceeding to Burutu, the headquarters of the Niger Company, and all ships proceeding to the ports of Warri, Kokotown, and Sapele enter here. The town is on the left bank of the Forcados river, near the coast, with a commodious harbour. It is 60 m. S.S.W. of Benin. Pop. 3,189, including 33 Europeans.

**Force** (Lat. *fortis*, strong). Fundamental conception defined by Newton as that which changes or tends to produce change of motion in a body on which it acts. Originally a muscular conception, it now incorporates electrical and magnetic manifestations, e.g. the power of a magnet to attract iron, etc., the attraction of the earth, sun, etc., i.e. gravitational force, etc. Force has been defined also as the rate per unit of length at which energy is transferred or transformed, so avoiding the conception that force is a thing of itself, or that it can exist without the presence of matter. Certainly the existence of force without matter is unknown.

In dynamics force is measured by the rate of change of momentum (q.v.), and is usually represented by lines of definite length and direction, and the resultant of two forces can be represented as the diagonal of a parallelogram, the sides of which represent the forces. (See Composition of Forces.)

The British unit of force, called a poundal, is a force which produces in one second a speed of one foot per second to a mass of one pound. In the centimetre, gramme, second system of measurement, the unit of force, called a dyne (q.v.), is the force which produces in one second a speed of one centimetre per second in a mass of one gramme.

The word force is also used of a body of men, e.g. police force; in card playing for the forced production of certain cards; in horticulture for the forcing of plant growth; and for the power exerted by an explosion.

**Forced Landing.** Aeronautical term for the coming to earth of an aircraft through some cause over which the pilot has no control.

**Forced Loan.** Money taken by kings and other rulers from their subjects by compulsion, but with the promise of repayment, thus differentiating it from taxation proper. Something of this kind has been done almost as long as society has existed, but in England it first became prominent in the time of Charles I. In 1626 Charles resorted to the device of a forced loan. He dismissed Coke from the chief justiceship for denying its legality, and he punished those who refused to pay by billeting soldiers upon them and in other ways. The question was tested in the courts of law by the Five Knights' Case; in this the judges' decision implied that the king alone could decide whether or not a loan was illegal. To this the parliament replied by the Petition of Right, which declared the exaction of "any gift, loan, benevolency or tax without common consent by Act of Parliament to be illegal." During the Great War suggestions were made from time to time that

money should be raised by a compulsory loan, but nothing was done in this direction.

**Forceps.** Instrument consisting of two blades for grasping or compressing tissues or objects. The midwifery forceps, used for assisting delivery with difficult labour, is one of the most beneficial instruments ever invented. There is some evidence that forceps of a kind were used in childbirth at Pompeii, and in the 10th century by Arabian physicians. The knowledge was, however, entirely lost, and was rediscovered about the beginning of the 17th century by Peter Chamberlen, a Huguenot refugee, who fled to England. Chamberlen and his sons and grandsons kept the secret in their family for nearly one hundred years, and it was not until 1733 that Chapman published a full description of the midwifery forceps. The word forceps meant an instrument for holding hot iron (Lat. *formus*, hot; *capere*, to grasp). A form of forceps is employed in nearly all surgical operations, and by dentists, watchmakers, etc. See Dentistry, illus.

**Forcible Entry.** Term used in English law. By a statute of Richard II, it is forbidden for anyone claiming land to make a forcible entry on it. However good his title may be, he must not assert it by force, or he will be guilty of a breach of the peace, and be liable to a fine.

**Forcible Feeding.** Administration by force of food to a person who refuses to take it. Liquid food is introduced into the stomach through a tube passed down the throat, or sometimes through the nostril. The procedure is occasionally necessary in the case of lunatics, and was resorted to in order to keep alive imprisoned women suffragists during the agitation for women's suffrage in Great Britain, about 1910-13.

**Forcing.** Art of bringing flowers, fruit, and vegetables to a state of maturity at an earlier date than in ordinary circumstances. Any heated greenhouse can be used as a forcing house, but where this is not available, fresh stable manure may be spread at the bottom of a pit, about 3 ft. in depth, and, when the rank steam has escaped, covered with a thick layer of good, rich loam, a cold frame or a series of portable hand-lights being placed over it. The decaying manure will create a high temperature, and the frames can be used for starting all half-hardy plants, and when the temperature of the decaying manure falls, the frames will serve to grow rhubarb, seakale, and sometimes mushrooms. If the tempera-

ture falls too rapidly, it must be renewed by the addition of fresh manure and litter. See Gardening.

**Forcite.** Term used for certain explosives in the U.S.A. and in Belgium. In the U.S.A. it is frequently used to designate blasting explosives, prepared by mixing gelatinised nitroglycerine with sodium nitrate (76), wood tar (20), sulphur (3), and wood pulp (1). The best known explosives under this name, however, are those which are manufactured at Baelen-sur-Nèthe, in Belgium, in which 40 to 67 p.c. of gelatinised nitroglycerine is mixed with wood meal and sodium, potassium, or ammonium nitrate.

**Ford** (Anglo-Saxon). Point in a river or lake at which man or beast can cross on foot. Fords and bridging facilities have fixed the site of all important riverine towns. Modern London includes the old city, built at the then best bridging point nearest the sea, and Westminster, founded where the Thames could be forded before London Bridge was built.

**Ford, EDWARD** (1852-1901). British sculptor. Born at Islington, he studied at Antwerp and Munich.



E. Onslow Ford,  
British sculptor  
Elliott & Fry

In 1875 he first exhibited at the R.A., became A.R.A. in 1888, and R.A. in 1895. Among his works are the Gordon group, 1890, of which replicas are at Chatham and Khartum; the Queen Victoria Memorial, Manchester, 1901; Folly (Tate Gallery). His many portrait busts are marked by delicate modelling and truth of likeness. He died at St. John's Wood, London, Dec. 23, 1901.

**Ford, HENRY** (b. 1863). American manufacturer. Born at Greenfield, Michigan, July 30, 1863, he began to work when a boy in an engineering shop at Detroit. He rose to be chief engineer at the Edison Illuminating Co., and in 1903 founded a business of his own at Detroit. This became the Ford Motor Co., and under his presidency the largest maker of automobiles in the world, turning out 3,000 a day, and employing 50,000 hands. Ford also turned his attention to



Henry Ford, American manufacturer

farm tractors, and these, known as Fordsons, were produced in great numbers.

In 1914 he instituted a scheme of profit-sharing for his employees, and as regards wages and hours of labour his firm was always most liberal. In Dec., 1918, he announced his intention of retiring in favour of his son, one of his new interests being a weekly periodical, *The Dearborn Independent*. In 1915 Ford brought a party of Americans to Europe in the hope of ending the Great War. But later he was convinced of the futility of this policy, and when his country became a belligerent he placed his resources at its disposal, produced war material on a vast scale, and subscribed £1,000,000 to the U.S.A. Liberty Loan.

**Ford, JOHN** (1586-c.1639). English dramatist. Born at Islington, Devon, April 17, 1586, he spent a year at Exeter College, Oxford, and then entered the Middle Temple. His reputation rests on his tragedies, *'Tis Pity She's a Whore*, 1626; *The Broken Heart*, 1629; and the historical drama of *Perkin Warbeck*, 1634. He collaborated with Dekker, Rowley, and Webster, with the two first in *The Witch of Edmonton*, c. 1621; with the last in a lost play, called *A Late Murder of the Son upon the Mother*. Charles Lamb placed Ford in "the first order of poets," though his genius was peculiarly sombre. W. Gifford's edition of his works, 1827, was revised by A. Dyce, 1869, and by Hartley Coleridge, 1840.

**Fordun, JOHN** OF (d. c. 1384). Scottish chronicler. He wrote the *Chronica Gentis Scotorum*, which make up the first five books of Walter Bower's *Scotichronicon*, and the *Gesta Annalia*, which carry this work from 1153 to 1383, and, as completed by Bower, to 1437. He was probably a chantry priest in Aberdeen Cathedral.

**Fordwich.** Parish and village of Kent, England. It is 2 m. N.E. of Canterbury, and was once a place of importance. In the Middle Ages and later, the Stour, which flows by here, was navigable, and Fordwich was a port, serving as the port of Canterbury, and a corporate member of the Cinque port of Sandwich. It has an old church, S. Mary's, with a Norman shrine and other features of interest. The old sessions house still stands, and there are remains of the port. It was a borough until 1884, when it lost its mayor and corporation under the Act of 1883. Pop. 254.

**Fore and Aft Rig.** Sails set towards bow and stern of a vessel, as in a cutter's rig. A vessel is square-rigged when her sails are



set athwart the beam or across the decks. In the Royal Navy fore and aft rig is colloquially used for the uniform worn by chief petty officers, or any other uniform of which peaked cap and monkey-jacket form a part.

**Forecastle** OR FO'C'SLE. Forward part of a ship where the crew live. The term is reputedly derived from the forecastle which used to stand here in the fighting ships of medieval days. A monkey forecastle is a small deck below the level of the forecastle proper.

**Foreclosure** (old Fr. *forclos*, shut out). Term used in English law. When a mortgagor has failed to pay the debt in accordance with his covenant, the mortgagee may take possession of the land or other security; but the mortgagor has, at any time, the right to come and say, "Here is your money and interest, give me back my security." This right is called an equity of redemption. If the mortgagee desires to exclude the mortgagor from this equity, he must bring an action to foreclose, when the court orders that if the mortgagor does not redeem within a certain time, generally six months, the equity shall expire, and the mortgagee shall become the owner of the security. See Mortgage.

**Foreign Bondholders.** CORPORATION OF. British association to protect the interests of those who have lent money to foreign countries. Founded in 1868 and incorporated in 1898, it consists of a president, vice-president, and council. The corporation is especially concerned with bringing pressure upon states, e.g. Honduras, which have failed to pay interest on their bonds, and negotiates with such in order to get something for the bondholders. It has been successful in many negotiations of this kind. Its offices are 17, Moorgate Street, London, E.C.

**Foreign Enlistment Act.** British Act of Parliament. There are two such Acts, the first passed in 1819 and the second in 1870. The substance is that British subjects must not take military service under a foreign state without the royal licence, nor equip ships to be used against any foreign state with which the country is at peace. In 1835 the Act was suspended in order to allow a legion to be raised to serve against the Carlists in Spain, and it was evaded during the struggle for Italian freedom. This, but more especially the event of the American Civil War, made necessary the stronger Act of 1870, which inflicts heavy penalties on those who fit out ships for raiding purposes on neutral ports

and shipping. It was under this Act that Dr. Jameson was tried in 1896. See Jameson Raid.

**Foreign Jurisdiction Act,** 1890. Statute providing for the exercise of jurisdiction over British subjects in certain countries. These are where the British crown has acquired such rights by conquest or cession, e.g. certain parts of China, and where there is no settled government. It also empowers the crown to make laws for the ordering of British subjects in ships in eastern waters within 100 miles of the Chinese and Japanese coasts. See International Law.

**Foreign Law.** English law treats foreign law solely as a matter of fact. If an English court has before it a case that turns on a question of foreign law, it will not refuse to decide the dispute. For its satisfaction, therefore, qualified lawyers of the country in question must prove in evidence what the law is, and on that the case will be decided.

**Foreign Legion** (Fr. *légion étrangère*). French corps in which, previous to 1919, Alsatians and Lorrainers who were born under German rule could enlist voluntarily. It also included men of other nationalities who had French sympathies, or desired a life of adventure. In peace time it garrisons a French colony, and in recruiting for the Legion the authorities are not particular as to age or character. The Legion has a great reputation as a fighting force.

The Legion consists of two regiments of four battalions, whose headquarters are in Algiers, and is officered chiefly by Frenchmen. Connected with the Legion are certain battalions known as the Zephyrs, which are in fact disciplinary units, the conscripts drafted into them as a punishment serving in the unhealthiest French colonies. The Legion greatly distinguished itself in France in the Great War. In Aug., 1920, it was announced that the Legion was to



Foreign Legion. Officer and men of the First Foreign Legion with their colours

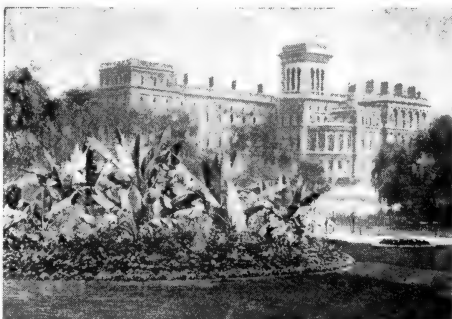
be reinforced and its scope considerably widened. A regiment of cavalry and of artillery and an engineers' battalion were to be added.

**Foreign Office.** British government department. Its head, the secretary of state for foreign affairs, has charge of all business affecting the relations of Great Britain with foreign powers. He appoints, sends out, and supervises ambassadors, consuls, and other diplomatic agents, and by various means, not excluding the use of secret agents, keeps himself acquainted with the course of affairs abroad. Much of the work is of a confidential character, and the staff is recruited by a different system from the rest of the civil service.

Until Sir Edward Grey became foreign secretary in 1905 the position was almost invariably filled by a peer, among the holders being Lords Palmerston, Clarendon, Salisbury, Rosebery, and Lansdowne. Before 1782, when the foreign secretary first came into existence, the control of foreign affairs was divided between the two

principal secretaries of state. The secretary is assisted by a parliamentary and a permanent under-secretary, and his office, entered from Downing Street, overlooks St. James's Park.

**Foreign Press Association.** London society for the promotion of the interests of editors and correspondents of



Foreign Office, London, seen from St. James's Park

foreign newspapers, periodicals, and news agencies, living in the United Kingdom.

**Foreland, NORTH AND SOUTH.** Two chalk headlands on the coast of Kent, England. The North Foreland, about  $2\frac{1}{2}$  m. S.E. of Margate, is the Cantium of Ptolemy, and has a lighthouse 188 ft. above sea level, with a light visible at 20 m. The South Foreland, 3 m. N.E. of Dover, has two lighthouses respectively 375 ft. and 275 ft. above sea level, and visible at 26 m. and 23 m.

**Foreman.** First or chief man. The word has two main senses. It means the one who speaks for his colleagues, the foreman of a jury. It is also used in industrial life for one who supervises constantly and in person the work of others. In factories, works, and building operations the workers are controlled by foremen.

**Foreshore.** Part of a beach or seashore which lies between the extreme limits of high and low water marks, i.e. is covered at high tide and uncovered at low tide. The extent of the foreshore depends partly upon the slope of the ground and partly upon the height of the tides. The boundary has been fixed, by a decision of English law, as the mean between the high and the low water mark. Foreshore is vested in the crown. See Coast.

**Foreshortening.** Technical term in perspective drawing. An object is represented as diminishing in extent according to the angle from which it is viewed, while at the same time its real length must be adequately suggested. Thus, in a portrait, an arm represented as pointing at full length directly towards the on-looker occupies less space than it would fill were it shown as pointing to one side; yet the perspective must be so managed as clearly to indicate that the length of the arm is the same. Faulty drawing might suggest an outstretched hand without proper support, or there might be some other defect. See Drawing.

**Forest.** Term originally applied to a royal demesne set apart for the preservation of beasts of the chase and to afford the sovereign facilities for hunting. Not necessarily wooded or uncultivated, it was frequently so called only because forest law was applied to it. The word forest (late Lat. *foresta*), ultimately derived from Lat. *foris* (out-of-doors), in modern times came to be more particularly associated with such uncultivated tracts as were thickly wooded. Even yet in Scotland the term deer-forest is used to describe an



extensive region quite devoid of timber. A forest consisted of vert and venison. The former comprised the high wood, underwood, and turf; the latter the beasts of the forest, chase, and warren.

The most extensive forest areas in the British Empire, and, indeed, in the world, are those of Canada, which cover between 500 and 600 million acres, about one-half of which are planted with commercial timber. Extensive reserves for the permanent supply of timber have been created by the Dominion Parliament since 1887, and those provincial governments which have forestry jurisdiction have adopted a similar policy, with the result that the total forestry reserves of Canada have increased from 7,413,760 in 1901 to 152,833,955 acres in 1918. Certain depleted areas have also been re-afforested. In Ontario spruce and other trees, which had previously no commer-



Foreland. The lighthouses. Above, that of the South Foreland; below, of the North Foreland

former colony a rather rigorous protective policy has been in vogue for some years. Still, spruce deals are exported and the manufacture of wood-pulp is carried on. British Columbia, on the other hand, with its 15,000,000 acres of marketable timber, possesses an almost inexhaustible quantity of paper-making woods, especially Douglas fir, yellow cedar, white pine, and arbor vitae.

British Guiana, perhaps, possesses the rarest and most extensive variety of timbers. Its forests are estimated to cover 78,500 sq. m. of country, but at present the workable area is confined to 11,000 sq. m. situated in the more accessible parts extending from the seacoast to where the large rivers are broken by rapids and falls which do not permit of the water-carriage of timber. The woods chiefly grown are mangrove, courida, kakaralli, wallaba, bullet tree, crabwood and hard-wood such as purple-heart, locust and suradanni, most of which are used in the manufacture of furniture.

Forests occupy a very small portion of the Union of South Africa. The largest are those in the Knysna and Humansdorp districts of the Cape, on the southern slopes of the Outeniqua, Longkloof, and Zitzikamma mountains.

In N. America the northern forests of Maine are remarkable for density and volume of growth, maple, birch, beech, and pine predominating. The forests of the



Foreshortening. Example of foreshortening of an arm, from a recruiting poster issued during the Great War

Courtesy of London Opinion

Southern states are by no means so thick, and produce oaks, pines, cypresses, gums, and cedars. The central states are rich in hardwood forests, growing chestnuts, hickories, and ashes. W. of the Rocky Mountains the forests of the Pacific coast produce trees of immense size, chiefly redwood, hemlock, spruce, and fir, and what is known as the "big" tree. The Rocky Mountains are in places covered with pine and spruce. Valuable stretches of timber exist in Alaska, especially along the river courses and on the lower slopes of the hills.

In S. America dense tropical forests prevail in the regions of the Amazon and Marañon, but because of the thick undergrowth and the numerous wild animals and reptiles which dwell therein, they are well-nigh impenetrable.

Thickly wooded areas still occupy a considerable proportion of the European continent. In France, where one-sixth of the afforested areas of 2,500,000 acres is state property, the forests of Ardennes, Orleans, Fontainebleau, Compiègne, and Rambouillet are administered by official agency. In Germany the Black Forest and those in Franconia and Thuringia are similarly managed. Russia has about 500,000,000 acres under timber, most of which is of small commercial value.

**Forestalling.** Commercial term denoting interference with public trade by buying up merchandise on its way to a market, or keeping other people's goods off the market, or making a ring in a market, all agreeing to charge the same high price. It was similar to the modern profiteering. Originally an offence, it was taken away from this category by an Act of 1844. *See* Engrossing.

**Forest Bed.** Series of deposits formed above the Pliocene Weybourne Crag and occurring beneath the glacial boulder-clay cliffs on the Norfolk coast. It comprises a lower fresh-water bed of clayey silt, an estuarine forest-bed (20 ft.) above, with stumps of trees and bones of mammals, and an upper bed of sand and blue clay (2-7 ft.), containing fresh-water shells. *See* Pliocene.

**Forest Cantons.** Four cantons of Switzerland, enclosing the Lake of Lucerne (Ger. Vierwaldstätter See). They are Unterwalden, Uri, Schwyz, and Lucerne.

**Forest Court.** Special courts of restricted jurisdiction formerly held in England. 'According to Blackstone, they were instituted "for the government of the royal forests in different parts of the

kingdom, and for the punishment of all injuries done to the king's deer or *venison*, to the *vert* or greensward, and to the *covert* in which such deer are lodged."

There were the court of attachments, held before the verderers every forty days to inquire into offences against *vert* and *venison*; the court of regard, or survey of dogs, held every third year, for the lawing or expeditation, by cutting off the claws and ball, or pelote, of the forefeet of mastiffs, the only dogs permitted within the forest precincts, to prevent them chasing the deer; the court of swainmote, held thrice a year before the verderers as judges, with the swains or freeholders within the forest as jurors, to inquire into oppressions committed by the officers of the forest, and also to try cases presented by the court of attachments; and the court of justice-seat, a court of record, held every third year before the chief itinerant judge to hear and determine all pleas and causes whatsoever arising within the forest. The last court of justice-seat was held *pro forma* only, shortly after the Restoration, and since the Revolution of 1688 the forest laws, and with them the forest courts, have fallen into desuetude.

**Forester, BARON.** British title borne since 1821 by the family of Forester. A Shropshire gentleman, Cecil Weld Forester, 1767-1828, was first holder, and the title passed to his sons, the second being M.P. for Wenlock 1828-74, and comptroller of the royal household. A third brother succeeded, and from him the present baron is descended. His estates are in Shropshire, where he has a seat, Willey Park, Broseley.

**Foresters, ANCIENT ORDER OF.** British friendly society. Founded in 1834 to provide its members and



Foresters' arms

their dependents with weekly allowances during sickness, old age, or widowhood, it has always been one of the most progressive in introducing new benefits in the way of endowment insurance, etc. The society, to which an initiation ceremony must be undergone, though the mystic ritual has been largely abandoned, is organized in courts and districts which owe allegiance to a central headquarters. Contributions vary according to the benefits desired. The order has spread to America and the British Dominions overseas. *See* Friendly Societies.

**Forest Gate.** District of Essex, England, and an E. suburb of London. It is 5½ m. N.E. of Liverpool Street station on the G.E.R. There are chemical and other industries. It is mostly included in W. Ham and E. Ham.

**Forest Hill.** Residential dist. and ward in the metropolitan borough of Lewisham, London, England. It is 5½ m. S.E. of London Bridge station, on the L.B. & S.C.R. The Horniman Museum, standing in a public park, and built at a cost of £40,000, was opened to the public in 1901. Pop. 20,804.

**Forest Marble.** Name of a geological formation comprising shelly and flaggy limestones. Alternating with layers of clay or marl, it is one of the Great Oolite group of Jurassic stratified rocks, and occurs in Dorset, Somerset (135 ft. in thickness), Wiltshire, through Oxfordshire into Buckinghamshire, where limestone thins out and is thence represented by clays. The formation is named after Wychwood Forest, Oxfordshire, where it was formerly quarried for building stone.

**Forest Pig.** Genus of huge black wild swine discovered in 1904 in the Ituri and Nandi forests of Central Africa. They have enormous heads, with conspicuous curved tusks; and there are large warty growths on the face. The animal has rarely been seen alive by Europeans.

**Forest Reserves.** Name given in the United States to areas reserved for purposes of conserving the trees, and now known also as National forests. In 1896 the National Academy of Sciences was asked to outline a rational forest policy, and in 1897 a further 21,000,000 acres were added to the existing reserves of 18,000,000. On June 30, 1917, there were 152 national forests with an acreage of 155,000,000.

Canada also has large forest reserves, something over 150,000,000 acres having been set apart. Of these, 107,000,000 acres are in the province of Quebec. In Alberta, on the E. slope of the Rockies, there is a reserve nearly 14,000,000 acres in extent. There are also extensive forest reserves in India. Under the state forest department these comprised 101,000 sq. m. in 1917-18.

**Forest Row.** Parish and village of Sussex, England. It is 3 m. S.E. of East Grinstead, on the L.B. & S.C.R., and a convenient starting-point for a visit to Ashdown Forest. Between Forest Row and East Grinstead are the ruins of Brambletye House, once the home of the Lewknor family, and the theme of a romance by Horace Smith. Pop. 3,035.

## FORESTRY: PRINCIPLES AND PRACTICE

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*The article Afforestation deals with another branch of this subject. See also Timber and the articles on the various forest trees, e.g. Beech; Birch; Oak; Pine, etc.*

Forestry is the science of cultivating trees, especially for providing timber.

Apart from the chemical composition of the soil, the amount of moisture it contains is a question of vital importance in the proper maintenance of a wood or forest. Climate is altered by the establishment of woods and forests. Within a wood the air is cooler in the summer time than it is in the open air, but the opposite is the case in winter time. This is due to evaporation, which, in the active growing season, is more abundant than in the winter time, when growth is at a standstill and sap is stagnant.

### Problems of Soil and Climate

It is mainly on the selection of the suitable trees for the proper soil that successful forestry depends. No hard and fast rules can be laid down, but it is certain no trees will really thrive in a soil that is waterlogged, that is to say, where stagnant moisture is present in large quantities. On moist soils, such as are found at the sides of natural water-courses, but where the water is in circulation and percolating through the soil, the willow, alder, spruce fir, and poplar may be planted with reasonable hopes of success. On chalky soils larch, Scots pine, beech, oak, ash, and sycamore are the best. On the ordinary rich loam any British timber tree will flourish. On sandy soil, only the coniferous trees, such as the pines, firs, and spruces, may be expected to produce profitable results; while on the heavy clay lands the British oak is the only tree, with perhaps the solitary exception of the hornbeam, which is likely to repay the trouble of planting and upkeep.

The most generally practised system of forestry is that of utilising old pasture or waste lands, and planting one- or two-year-old trees upon it. These young trees are roughly but simply planted by the process of cutting a triangular or tongue-shaped piece of turf up with a spade, splitting the tongue in the middle, loosening the soil underneath, placing the young tree in position, and then pressing down hard upon it the two half tongues of turf. Such young trees are usually planted about 5 ft. apart every way. In bleak and exposed situations it is sometimes the practice to harrow the surface of the ground before planting, and

to sow seed of the common gorse or furze, which, being a quick-growing subject, will act as a "mother" for three or four years to the young trees, until they have fully established themselves. Sometimes, however, when the soil happens to be rather more fertile than was originally imagined, the gorse will obtain such a hold upon the place that it will probably strangle all the trees it is intended to "mother," and render replanting necessary.

Owing to the vagaries of the British climate, the establishment of a forest or wood from seed rarely proves successful. But where prime cost is a matter of consideration, even if only one in four of the trees sown turns out to be fertile, the results will be found eminently satisfactory financially. In establishing a forest from seed the surface of the ground must first of all be broken up. This can be done by a harrow or, in the case of stiff clay lands, by the plough. It is well to sow seed with a liberal hand, as losses from dead seed, the ravages of vermin, and bad weather are enormous. The following quantities of seed are ample for sowing one acre of ground: Beech, 8 bushels; elm, 15 lb.; larch, 15 lb.; oak, 9 bushels; silver fir, 30 lb.; Scots pine, 8 lb.

Acorns and beech-mast are, of course, much more bulky than the seed of other native British forest trees. A pound of Scots pine seed consists roughly of 60,000 seeds, and larch bulks about the same. Ten thousand acorns fill a bushel measure, which would hold 50,000 beech nuts.

### Depredations by Rabbits

Rabbits constitute a grave danger in all newly made plantations, and the only effectual method of guarding against their depredations is wire netting well pegged down and sunk into the surface of the ground. Several instances are recorded in which, during a hard winter, rabbits have disturbed and destroyed a whole plantation of young firs by gnawing away the bark of the trees, and leaving the stems exposed to the frost. Where sufficient labour is available, it is well to cut a niche some 6 ins. or a foot below the level of the ground and bury or plant the wire netting to that depth.

It is only to be expected that young trees raised from seed sown

thickly and indiscriminately will die down right and left, especially in dry and exposed situations. In the S.W. of England, the sandy heaths of Surrey and Hampshire, and the moist districts of Ireland, plantations, especially of conifers, will quickly establish themselves. At the end of three years a fir plantation may be considered to be a commercial proposition, and the young trees will have attained sufficient strength to carry on until thinning is requisite. It should be borne in mind that conifers and beeches prefer shady situations, while the ash and the oak are better in broad sunlight.

### Guarding against Decay

One of the chief difficulties in forming a new wood, or clearing up and rejuvenating an old one, is usually the presence of old and unhealthy timber. All dead and dying trees, ragged and tangled undergrowth, and other unprofitable stuff must be promptly cleared away in order to afford room for new seedlings, which require light, air, and sun. A competent forester will watch keenly for signs of decay among the trees under his care.

Decay begins to take place as soon as a tree has attained full maturity, and ceases to put forth fresh branches and vigorous leaves. It has reached the zenith of its power and should be at once cut down and sold. If, for sentimental reasons, the tree is allowed to stand and continue to decay, it will spread that decay to other trees, and thus bring a plague upon the whole plantation. The grand old oaks, yews, and other trees which are supposed to have existed at the time of the Norman conquest, and still continue to exist, are examples of splendid sentiment but bad forestry, and it is well that they are chiefly found in isolated specimens, and not in groves or forests, where they would cause an incredible amount of damage.

The question of thinning timber is a vexed one. In the case of larch, ash, and other close-growing woods, thinning may be carried out almost with impunity, for the young poles find a ready and remunerative market. This does not apply to the oak, beech, or other trees where girth is a greater consideration than height. The ideal wood or plantation is the one where the trees exhibit long and straight trunks, with the minimum number of side branches. Where planting has been carried out sufficiently closely, these side branches die off naturally for want of light and air, and this process or operation is called natural pruning. Pines and firs lend themselves

most readily to close planting, and such plantations are naturally the most easy of management.

Dealing with the timber trees in the degrees of importance, pride of place must be given to the oak, which for timber purposes may be planted, in the case of young trees, within 3 ft. of each other, so as to destroy the chance of lateral branches asserting themselves and destroying the strength of the main trunk. Even when thinned the trees in an oak plantation should never be more than 12 ft. from each other.

The beech, the best tree for a calcareous or chalky soil, is not of great value as a timber tree. The wood is best if cut in the middle of winter, when the vitality of the tree is at its lowest ebb, and is useful for brush handles, dairy utensils, chairs, and other purposes not of the first importance.

#### Spruce, Pine and Fir Planting

If planting for the present generation, and not for posterity, is the object to be considered, the most remunerative plantations to lay down are those of spruce, pine, and fir. These will thrive in comparatively poor soils, cost less to establish than woods of any other kind, show a cash return from thinnings at an earlier date, and attain maturity sooner. British forests have been denuded of coniferous timber to an unparalleled extent by the demands of the Great War, and both in Britain and on the Continent the prices which obtain on the market will be unprecedented for many years. Larch is always a good marketable timber, and there is a level demand for ash in the furniture trade, but it is doubtful if ash, sycamore or chestnut will command the prices they have done in the past.

For the first few years after planting, young trees, except conifers, need very little in the way of attention. Plantations of spruce, pine, and fir should be gone over carefully to look for the defect generally known as pronging. Pronging is the presence and growth of a superfluous side shoot near the top of the main stem, dividing the stem at the apex into two false heads, like the prongs of a catapult. The continued existence of this secondary stem will prove fatal to the tree both from an ornamental and useful point of view, and therefore it is necessary to cut it ruthlessly and promptly away, otherwise the symmetry of the tree will be destroyed. Some foresters merely break the secondary stem away from the main trunk and leave it hanging on the tree to die.

The common-sense object of practical forestry is to obtain the heaviest yield of timber possible per acre, consistent with profitable marketable quality; hence it is a golden rule in sowing or planting to err rather on the generous side as regards the quantity of seeds or young trees established per acre. It is always possible, and, indeed, beneficial, to thin plantations which are overloaded with young timber. It is not so easy to make up a plantation which, for reasons of false economy, has been thinly planted, and in which for want of mutual support the young trees are weedy and leggy. Naturally, the closer trees are planted together, the longer, straighter, and more valuable will be the timber.

Thinning of woods should be in exact proportion to the amount of exposure to which they are subjected. For instance, a plantation upon a bleak hillside in Scotland needs less attention than one in the Lowlands. Thinning should also be carried out with a lighter hand on, and towards the edge of, the wood which faces the direction of the prevailing winds, since the outer belt of trees will afford some protection from the violence of tempests.

In old and neglected woods, where thinning has not been carried out for some time, the operation should be spread over a number of years, otherwise the sudden exposure of the whole plantation to wind and weather may cause serious and permanent injury. The tops of growing trees should not be opened too freely with the idea of admitting light and air. This only checks their growth, and is better deferred until the trees have nearly attained their full height. In addition, when young trees are very thin in the trunk in proportion to their height, to tamper with their heads will tend to cause the trees to grow crooked.

#### Thinning Mixed Plantations

When thinning an old wood in which there is no undergrowth or coppicing, it is necessary to preserve a canopy overhead, that is to say, a complete covering of foliage, in order to protect the roots and conserve moisture. Where, however, the wood is liberally planted with underwood this is not necessary, as the coppice will form a screen. Indeed, in dealing with these mixed plantations it is often better to thin the older timber with a free hand in order to admit plenty of light and air to the coppice, which may prove to be the most profitable part of the plantation. During the first seventy years of its existence an oak plantation needs

to be thinned approximately once every ten years, according to soil and situation. At the end of that period, once in every twenty years is sufficient. Pines and other timbers, being, generally speaking, of more rapid growth, require thinning at more frequent intervals.

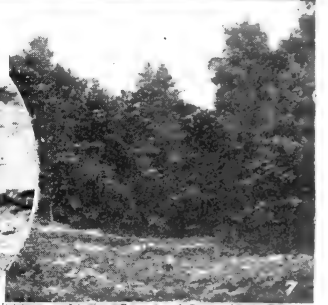
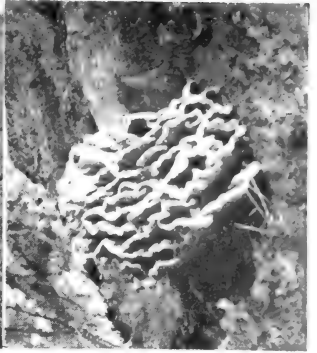
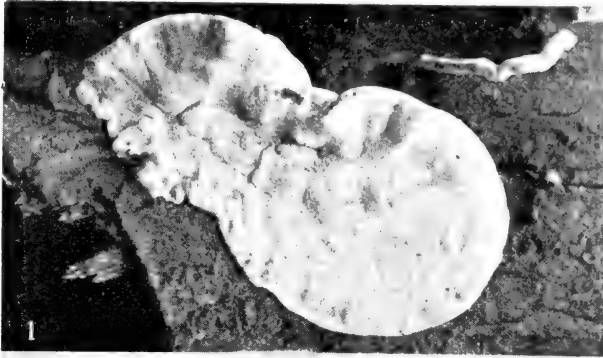
The quality of timber depends upon its weight, toughness, and durability or hardness. Where the tissues are closely compressed and the structure is dense, the wood will be heavy, but timber which contains much watery sap shrinks rapidly, and decays quickly when exposed, owing to excessive evaporation. Oak and pine shrink very little, and slowly; elm, poplar, and willow very rapidly. As a general rule those trees which take the longest time to attain maturity yield the hardest timber, e.g. box, yew, and ebony, although the last is not a British timber tree. Oak is hardest when grown in loam upon a subsoil of blue clay, which renders the ground ferruginous, i.e. impregnated with oxide of iron. Soil of this nature improves the quality of the timber, but at the same time retards the full development of the tree.

#### Use of Axe and Saw

The axe is by no means the best implement to employ where economy of timber is desirable. The simplest form of felling, as practised in Britain, is "grubbing." This consists of clearing away the soil from around the roots of the trees, so that they are exposed, and then attacking them with axe and pick. As its supports are loosened the tree readily falls by its own weight, and though the remaining attached roots must be severed afterwards, this method has the advantage of leaving no stump in the ground, which saves considerable time and trouble where it is intended to follow with the plough, or to replant with timber. The use of the double-handed saw is, perhaps, the most general method of tree felling, though this as a rule necessitates the employment of the time of three men, two to saw and a third to wedge the cut with an iron wedge and sledge hammer, in order to prevent the weight of the trunk gripping the sawblade in the cut.

The simplest, quickest, and cleanest method of tree-felling, where a considerable quantity of timber has to be dealt with, is to use a patent steam tree feller, a machine invented in the 19th century. With the huge demand for timber in Britain, it was freely employed, notably at the felling of the Ercall Woods, near Newport, in Shropshire. It consists of a simple





1. An outward symptom of internal disease: red-rot fungus, *Fomes annosus*, on Scots pine. 2. Sulphur tuft fungus, *Polyporus sulphureus*, on oak. 3. Larva of sawfly, *Lophyrus pini*, attacking young pine shoots. 4. Yew forest on Surrey chalk hills. 5. Wood of Scots pine grow-

ing in Surrey. 6. Horntail wasp, *Sirex gigas*, whose grub spends several years mining the solid wood. 7. Self-sown pine wood on a Surrey heath. 8. A Surrey beech wood. 9. Neglected oak trees, *Quercus robur*, with much wood but yielding little serviceable timber

form of horizontal engine, the piston-rod of which projects from the cylinder in the form of a saw blade. The machine is clamped at the foot of a tree, and steam at 80 lb. pressure is admitted direct to the cylinder through a hose pipe connected with a stationary vertical boiler.

The saw works to and fro as a piston-rod would do, and will cut through the trunk of an average fir, level with the ground, in one minute, or through a large tree in three minutes. The boiler is fed with waste wood, and the machine can be carried from tree to tree by two men. The area that can be cleared without the necessity for moving the boiler is only limited, within reason, by the length of the connecting hose pipe. The machine, run by a couple of men, will account for fifty trees a day.

The detection of decay in growing timber is impossible to anyone but a trained expert, and, unless it has reached nearly to the bark, and is outwardly visible, its existence is usually unsuspected unless, as occasionally happens, it manifests itself in poverty of foliage. In a felled and stripped log or trunk, however, soundness may be ascertained in a simple manner. The ear should be placed close to one end of a log, and a person at the opposite end of the log should deliver a series of sharp blows with a hammer or mallet upon the wood. If only a number of dull thuds result it may safely be assumed that the wood is bad and decayed, but if the blows ring loud, clear, and continually resonant, it is sound.

**Bibliography.** Elementary Forestry, C. E. Curtis, 1905; Manual of Forestry, W. Schlich, 1911; Forestry Work, W. H. Whellens, 1919; Commercial Forestry in Britain, E. P. Stebbing, 1919.

**Forestry Corps.** Unit of the British army during the Great War. To secure an adequate supply of timber for the various purposes of the Great War, Britain decided to request help from Canada. Men were at once enrolled there, and the first draft reached England in

April, 1916, and proceeded to the extensive woods around Virginia Water, near Windsor. Two other drafts soon followed, bringing the strength up to 1,609 of all ranks.

The corps did not wait for the delivery of their own machinery, but adapted whatever they could get, both in England and Scotland.

The development of these lumber battalions from Canada into a distinct Forestry Corps took place in Oct., 1916, Colonel MacDougal being made its brigadier-general. By Jan., 1917, it was found necessary to provide a base, training and mobilisation camp in England, and by June of that year the corps in England and France totalled 15,000, and by Jan., 1918, it had grown to 18,000. In Britain there were 38 camps or establishments and in France about 70.

**Forez, MONTS DU.** Wooded range of mts. in the dept. of Loire, France. They lie in the W. of the dept., and divide the basins of the Allier and the Loire. The loftiest summit is Pierre-sur-Haute, 5,380 ft. The range is also known as the Monts de la Madeleine and the Bois Noirs. The old division of Forez, in the prov. of Lyonnais, is now included in the dept. of Loire.

**Forfar.** Parl., royal and mun. burgh, and the county town of Forfarshire, Scotland. It stands in



Forfar arms

the Howe of Angus, 21 m. N.E. of Dundee, on the Cal. Rly. The chief buildings are the county hall, town hall, court house, and Meffan Institute. A public hall and a park were given by Peter Reid, a merchant here. The chief industries are the manufacture of linen and jute; others are tanning, bleaching, and rope-making. It is also a rly. junction. The burgh is governed by a provost and council, and the corporation owns the gas and water supplies.

Forfar was a royal residence of Malcolm Canmore, whose castle on

a hill to the N. of the town was taken and destroyed by Bruce in 1308; its site is marked by a cross erected in 1648. It was made a burgh in the 13th century. Forfar is one of the five Montrose burghs which jointly return a member to Parliament. Market day, Sat. Pop. (1921), 9,585.

**Forfarshire** OR **ANGUS.** Eastern maritime county of Scotland. It is bounded S. by the Firth of Tay, and has an area of 873 sq. m. It has a grandly varied surface, falling into four natural divisions—the Braes of Angus, belonging to the Grampians and scored by several picturesque glens, in the N.W.; the Howe of Angus, a part of Strathmore, in the centre; the Sidlaw Hills in the S.W., and the fertile plain in the S.E. Glas Meal (3,502 ft.), in the N.W., is the loftiest summit. The N. and S. Esks and the Isla are the main streams, and of several small lakes Loch Lee is the largest. Agriculture and cattle-rearing are prominent, and jute and flax manufactures occupy many people, but the minerals are of little economic value. Montrose and Dundee are fishing centres; Dundee, Montrose, and Arbroath are the chief ports.

The Cal. and N.B. rlys. serve the county. Forfar, the county town, Dundee, Arbroath, Brechin, and Montrose are the principal towns. One member is returned to Parliament. Pop. 270,950. Evidences of Roman occupation include camps; among other antiquities are the castle ruins of Edzell and Melgund, and the round tower at Brechin.

**LITERARY ASSOCIATIONS.** At Dundee in 1465 was born Hector Boece (*q.v.*), and nearly two centuries later, at Baldovie, the classical scholar and educational reformer, Andrew Melville. Among the Forfar poets are Alexander Ross, the Lochlee schoolmaster who wrote *Woo'd an' Married an' A'*; William Thom, the weaver, who lived for some years in Dundee, and is buried there; and James



FORFAR. The county town of Forfarshire seen from Balmashanner Hill, looking towards the north



Forthshire, Scotland. Map of the east coast county which includes the old district of Angus

Tytler, the dialect poet, who edited the second and third editions of *The Encyclopaedia Britannica*, and who was born at Brechin. Thomas Dick, writer and lecturer on popular science, was born at Dundee and died at Broughty Ferry. James Mill, the utilitarian philosopher, was born at Northwater Bridge, Logie Pert, and Sir Charles Lyell at Kinnordy, near Kirriemuir. At Kirriemuir itself was born Sir James M. Barrie, who has made his birthplace famous as *Thru*s.

**Forfeiture** (late Lat. *foris factum*, something done outside). Deprivation of lands, goods, or other property, usually in consequence of a sentence passed by a court of law, or some breach of the law. In English law a person convicted of felony, treason, *felo de se*, and certain other offences, including striking a judge, forfeited all his lands and goods to the crown. This was abolished by the Forfeiture Act, 1870. At common law, also, an illegal conveyance of land, e.g. to an alien, before the Naturalisation Act, 1870, or to a corporation in mortmain, was similarly punished.

The most common instance of forfeiture is in the case of leaseholds. Leases very generally contain conditions that if the tenant shall not pay his rent, or perform the covenant of the lease, e.g. to keep the premises in repair, the landlord may re-enter the premises

and forfeit the lease. Courts of equity, however, would always and still do relieve against the forfeiture, and allow the tenant to keep his lease if he comes and offers to make good his default and repay the landlord any expense he has been put to. On breach of any covenant, except a covenant for payment of rent or a covenant not to assign or underlet, a landlord cannot begin proceedings to enforce a forfeiture without giving the tenant notice to make good the breach. No notice is required or relief given where there is condition for forfeiture on the tenant's bankruptcy.

**Forge** (Lat. *fabrica*, workshop). In metallurgy, term with a wide meaning. It covers the simple hearth of the blacksmith, early furnaces such as the Catalan forge (*q.v.*), in which malleable iron was produced in Europe for a long period, and the modern extensive plant comprising furnaces, cranes, hammers, rolling mills, presses, engines, or motors and boilers, which make up a modern iron-manufacturing works. It always relates, however, to the working of iron from a crude or semi-manufactured form, to a higher order, as distinguished from melting and casting. See *Iron*; *Metallurgy*; *Steel*.

**Forgery** (Lat. *fabricari*, to frame). English law term for making or altering a written instrument which purports to be valid on the face of it, with intent

to defraud. The common notion that forgery always consists in signing a false name, or imitating somebody's signature, is wrong. Thus, to alter the date or amount on a cheque, account, or receipt, though the signature is genuine, is forgery, if the alteration be made with intent to defraud. On the other hand, merely to subscribe a false name on a note or cheque may not be forgery at all if there is no fraudulent intent. The law on the subject is dealt with by the Forgery Act, 1913.

**Forget-Me-Not.** Hardy perennial plant of the natural order Boraginaceae, genus *Myosotis*. Na-



Forget-Me-Not. Leaves and flowers of the perennial plant

tives of Britain, their height is from 7 ins. to 18 ins.; the flowers are blue and yellow. Several cultivated varieties are raised from seed planted out of doors in spring, and transplanted to their permanent positions in the autumn, when they will flower in the spring and summer of the following and successive years. The best position is a moist corner of the rock garden. The well-known blue variety is *M. palustris*, which, though found naturally by the sides of brooks and streams, will thrive equally well in the garden as an edging, or in small beds or borders in moist peaty soil. A rarer natural species is *M. palustris alba*, which has white flowers.

**Forget-Me-Not.** Drama by Herman Merivale and F. C. Grove. It was produced at The Lyceum, Aug. 21, 1879, by Genevieve Ward, who acted in the piece all over the world.

**Forging.** Production of articles of iron or steel or other metal by hammering, pressing, rolling, or otherwise shaping the metal while heated but not in a molten condition. It is distinguished from casting by the fact that the metal is never raised to a temperature sufficiently high to melt it.

It is almost certainly the most ancient branch of the whole art of metallurgy, and was first practised by primitive man in shaping

pieces of native copper into rough weapons or implements. It depends upon the property which metals possess, some more eminently than others, according to which they "flow" under pressure while in the solid state. In its broad sense it embraces all the operations of shingling, cogging, and rolling by which "merchant" bars and plates are produced; the works in which such operations are carried out, while frequently styled rolling mills to-day, were originally termed forges, and the term is still largely retained.

These processes involve, first, the proper heating of the crude mass of metal to the requisite temperature; and, secondly, the use of tools specially adapted to impart the desired shape to the heated mass of metal. They are modified more or less according to the metal which is to be operated upon—iron, steel, copper, aluminium, Muntz metal, Delta metal, phosphor bronze, gold or silver. The forging proper will nearly always begin with a reducing operation, "drawing down" a piece of metal to a smaller size.

Thus, in the production of an ordinary stonecutter's chisel, a round or a six-sided bar of steel of the desired thickness will be taken. The end of this bar will be heated in the smith's fire, and as soon as the right temperature has been reached the bar will be withdrawn, the heated end laid on the smith's anvil and hammered out—drawn down—until it has assumed the required chisel shape. If the chisel is a small one the whole operation so far may be done by the smith himself with his hand hammer.

#### Principal Operations of Forging

Otherwise the chisel will be finished by the use of a "swage," which in this case will be a flat-faced tool held in a handle made of twisted iron rod. The smith will lay the face of this swage on the end of the chisel and his helper or striker will strike it with his sledge-hammer, thus producing a finished surface of the desired shape, free from hammer marks. The end of the bar will then be notched by means of a smith's chisel at a distance up the bar corresponding to the length of the chisel desired, and the piece broken off. It is not yet finished, however; it will be desired to flatten out and round off the blunt end of the chisel. That end is therefore heated again, the chisel is then withdrawn, and the end hammered or knocked upon the anvil, when it will be broadened out more or less, as required. This operation is called "upsetting." The production of this simple article

thus illustrates four principal operations of forging—heating, drawing down, cutting off, and upsetting.

Other principal operations are bending, holing, and welding. In the production of a great propeller or engine shaft which may weigh 100 tons, or of a 100-ton gun, the operations are essentially the same.

#### Drop or Die Forging

In the modern system of drop or die forging, the heated piece of metal is pressed into a die, a hardened steel form, by a hammer falling or dropping repeatedly upon the die. The hammer is worked mechanically, its weight amounting in large machines to 3,000 lb. Many of the parts of motor-cars, motor-cycles, bicycles, and innumerable other articles in iron or steel are now made by drop forging. Bolts and nuts, screw blanks and rivets are now made chiefly by machine forging, in which the machine takes a heated bar of iron or steel, cuts off a definite length, shapes the latter to the form required, and ejects it automatically. See Casting; Metallurgy; Welding.

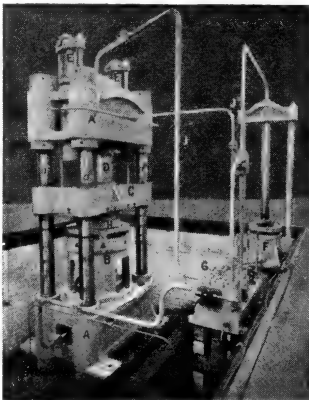
**Forging Press.** Instrument used in metallurgy. The increasing sizes and complexity of articles in malleable iron and steel required in

engineering particularly, such as heavy flanged plates, cranks, and crank shafts, began to make their production by means of the steam-hammer difficult. Attention was therefore directed to the hydraulic press as likely to prove a more effective appliance, and such objects are now largely produced by its aid. Very powerful presses, capable of exerting a total pressure of 10,000 tons, have been built for forging purposes. The illustration shows a press of this character with its pumps and control valves, adapted as it stands for the production of flanged wheels and other heavy flanged plates by direct pressure.

**Forisfamiliation** (Lat. *foris*, outside; *familia*, family). In Scots law, the alienation of a child from his father and exclusion from further inheritance, by marriage, by provision made for him by his parents in ante-nuptial settlement or other portioning, or by his own renunciation of his legal right to legitim (*q.v.*). The custom is derived from the Roman law of emancipation of a son from his father's power by fictitious sale and manumission, by imperial rescript, or by formal declaration, after which the son became independent (*sui juris*), quitted the family to which he formerly belonged, and, as a general rule, lost the rights of agnation.

**Fork** (Lat. *furca*). Instrument for holding or lifting. It consists of a handle, terminating in two or more prongs. An example is the table-fork of silver or other metal. A tuning fork (*q.v.*) is a two-pronged steel instrument which when struck gives a fixed and definite note, used to determine musical pitch. By analogy the word is used for something (*e.g.* a road) which divides into two.

The farm implement of this name has a wooden handle and two or more steel tines. The two-tined kind, when large, is known as a pitchfork, used for loading hay or grain. Short, stout, emptying forks, of similar pattern, serve for unloading, while turning and collecting forks are still smaller, but with the same number of tines. Digging forks possess three to five tines, which may be round, square, or flat. Additional leverage is given by a sharply bent neck, and a short handle is preferred. Dung forks, for dealing with farmyard manure and litter, usually have three or four curved tines of circular section. Caving, cocking, or poking forks, for collecting and loading short material, are somewhat similar, but the tines are long and wide apart, while they are continued backwards above the neck



Forging Press. A, A'. Base and head connected by columns, a, a', a''. B. Stand attached to base and to upper part of which tables and dies are attached. C. Inverted platen attached to ram, D, which works up and down under hydraulic pressure. Platen slides up and down columns. E, E'. Retractor rams which pull up the platen after each downward stroke. F. Intensifier which puts final extra pressure on ram, D, and articles being made. G. Hydraulic pumps working rams. H. Flanged tire of small railway truck wheel receiving finishing press. Ram, D, may make from 30 to 80 strokes per minute, each pressing article a little nearer final shape. J, J', J''. Hydraulic connexions conveying pressure to the various rams

and connected by a cross-bar, so as to prevent the forked-up stuff from falling off again.

**Forli.** Prov. of N.E. Italy. Bounded E. by the Adriatic Sea and N. by the prov. of Ravenna, its area is 730 sq. m. The surface is flat and low-lying, and the soil fertile. The chief products are wine, grain, silk, and sulphur. Pop. 316,420. *Pron.* For-lee.

**Forli.** City of Italy, the ancient Forum Livii. The capital of the prov. of Forli, it stands in a fertile plain, intersected by the rivers Montone and Ronco, 40 m. by rly. S.E. of Bologna by the main line from Bologna to Brindisi. A walled town, it contains a cathedral (re-built), a citadel, 1361, utilised as a jail, a lyceum, technical institute, a municipal art gallery, a town hall, a good library, and a hospital. The churches contain pictures and frescoes by local masters. A thriving trade is carried on in cattle, cereals, wine, silk, and hemp, while the manufactures include furniture, earthenware, machinery, head gear, shoes, and silk goods. Founded about 200 B.C., in the Middle Ages it was part of the exarchate of Ravenna. It experienced many vicissitudes during the quarrels of the Guelphs and the Ghibellines, and fell to the papacy in 1504. Pop. 48,943.

**Forlorn Hope** (A.S. *fore-lioran*, to send forward, *haufe*, a troop). Military expression once signifying troops sent forward. The implication that they are to carry out a specially dangerous enterprise is a comparatively modern use of the expression. The French, Dutch, and German equivalents are *enfants perdus*, lost children, *verloren hoop*, lost troop, and *verloren Posten*, lost post. In hunting phraseology, a hound that follows the chase in front of the rest of the pack is referred to as a forlorn or forlorn hound. In ordinary language forlorn hope is used of any hopeless undertaking, hope being erroneously identified with hope meaning expectation, a word of an entirely different etymology.

**Form** (Lat. *forma*). Word literally meaning shape. It denotes the manner in which the matter or parts of a whole are combined. Thus, a table or a chair may be made of pieces of wood, but the form of a table differs from that of a chair in the arrangement of the materials. Aristotle lays down four causes or principles of being—the material, the formal, the efficient, and the final. The three last-named on examination will be found to run into one another, leaving only the opposition of Form and Matter. Matter is possibility

or potentiality (*dynamis*) which becomes actuality (*energeia*) by its conversion from indeterminateness into something definite. As an adaptation of the Platonic idea, form is the realization of the ideal, e.g. of a perfect table, that the carpenter has in mind. *See* Matter.

**Form.** In music, the plan of construction, or the arrangement of phrases, sections, and movements. There is no limit to the possible varieties of musical form, but a few outstanding classes may be named. Binary form has two main divisions, as exemplified in the old air Barbara Allen; ternary form has three divisions, as in Charlie is My Darling. From these two germs most of the larger specific forms have been evolved, such as the rondo, the sonata, and all their derivatives. The fugue is essentially a contrapuntal movement of continuity, but it has an underlying basis of sectional form.

Many compositions bearing other generic names are also referable to these forms; e.g. many songs and short instrumental pieces are in simple ternary form, called also primary, song, or lied form; many marches are in rondo form; the minuet and trio, in a suite, or sonata symphony, are each in either binary or ternary forms, while together, with the recapitulation of the minuet, they constitute a larger ternary form. *See* Minuet; Suite; Symphony; Trio.

**Formalin** or FORMALDEHYDE (HCOH). Pungent gaseous compound first prepared in 1867 by Hofmann by passing methyl alcohol vapour and air over a heated platinum spiral. A 40 p.c. solution of formaldehyde is known as formalin, and is the form in which the gas is obtainable in commerce. A current of air drawn by an aspirator is passed over methyl alcohol and in contact with copper gauze, formaldehyde being formed. The gas is made to pass through a series of receivers containing water, until the water is saturated with the gas. Formalin is employed as a preservative and antiseptic. Combined with ammonia, formaldehyde yields hexa-methylene-tetramine, which, under the name of urotropine, is extensively used in medicine as an internal antiseptic.

Formalin is a powerful caustic; when mixed with ten times its volume of water it may be used for removing corns. A 30 p.c. solution may be employed for the treatment of ringworm of the scalp, and a solution of 1 in 500 may be used as a mouth-wash. Formalin is not much used in surgery as an antiseptic, as it tends to retard

healing. It is a powerful disinfectant and has the advantage that it does not injure coloured fabrics.

**Formalism.** In philosophy, the tendency to consider mere form or externalities as the only valuable part of anything. Thus, the adherence to cut-and-dried rules, like those of formal logic, is formalism. The same applies to the rules of composition in sculpture or painting. The term is specially used of strict adherence to religious forms and dogmas characterised by the absence of a genuine religious feeling. Formalism is rather the reduction of such forms and dogmas to a written system.

**Forman, HARRY BUXTON** (1842–1917). British author. Born in London; he was from 1860 to 1907 in the Civil Service, rising to be second secretary to the general post office and controller of packet services. In addition to his Letters of John Keats to Fanny Brawne, 1878, his Elizabeth Barrett Browning and Her Scarcer Books, 1896, and his Books of William Morris, 1897, Forman edited the standard edition, 1876–80, of Shelley's works. He collected Trelawny's Letters, 1910, deciphered Shelley's Note Books, 1911, and enlarged Medwin's Life. His industry and discrimination were of great value to students of Shelley and his work. He died June 15, 1917.

**Forman, SIMON** (1552–1611). English astrologer and quack doctor. Born at Quidhampton, Hampshire, Dec. 30, 1552, and left destitute as a boy, he entered Magdalen College, Oxford, as a poor scholar, 1573. After some years' experience as an usher

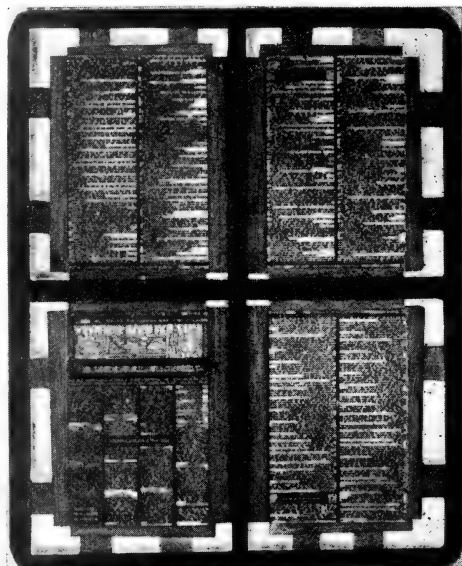


Simon Forman,  
English astrologer

in small country schools he claimed miraculous powers, and in 1580 professed to be able to cure diseases. He studied medicine and astrology in Holland, and in 1583 started practice in London, wrote treatises on mathematics and medicine, and began to seek the philosopher's stone. Though frequently arrested at the instance of the College of Physicians and other authorities, he worked among the poor in plague-stricken areas and obtained a large and far less honourable practice among court ladies; e.g. his aid was sought by Lady Essex to alienate the love of her husband and influence the affection in her favour of Somerset.

Cambridge granted him a licence to practise medicine in 1603.





Forme. Four pages of type locked up in a chase, making a forme ready for printing

Richard Nicolas, in Overbury's Vision, 1616, thus refers to him:

Forman was that fiend in human shape  
That by his art did act the devil's ape.

His philtres are alluded to in Jonson's Epicoene (iv, 1), and his career suggested much in Jonson's play, The Alchemist. He died Sept. 11, 1611, and was buried in S. Mary's Church, Lambeth. His MSS., which came into the possession of Elias Ashmole, included a diary, 1564-1602, publ. 1849; Notes on Chemistry, Astrology, Alchemy, and Geomancy; and a Booke of Plaies.

**Formation.** In geology, an old term used to denote a group of strata or rock-beds. They are distinguished by common lithological characters, such as the Upper Greensand formation (sandstone) and Gault (clay). Modern divisions of stratified rocks are based on fossils enclosed, which often prove strata of different lithological aspect to be of same age. For these divisions "stage" names are applied, e.g. Selbornian stage, which includes both Upper Greensand and Gault formations.

**Formby.** Urban district, market town, and watering-place of Lancashire. It is 7 m. S.W. of Southport, and has a station on the L. & Y.R. It is really a residential suburb of Liverpool. Near are the Altcar Flats, on which the Waterloo Cup is decided. Pop. 5,950.

**Forme.** In printing, a page or number of pages of type, or stereotype plates, arranged or "imposed" for printing and secured or "locked

up" in a metal frame called a chase. See Printing.

**Formentera.** One of the Balearic Islands, in the W. Mediterranean Sea, belonging to Spain. It is the smallest and most southerly of the group, and lies 7 m. S. of Iviza. Area 37 sq. m. Fishing and salt-working are engaged in. Pop. 2,600.

**Formia.** Town of Italy, in the prov. of Caserta, until recently called Mola di Gaeta. Situated on the N. side of the Gulf of Gaeta, 48 m. by rly. W.N.W. of Caserta, it is a seaside resort. A Volscian town, known as Formiæ, it stood on the Appian Way and was a residential district for wealthy Romans, remains of whose villas stud the coast. Here Cicero lived, and met his death, near his villa, Dec. 7, 43 B.C. The town has a little trade in olive oil and earthenware, and the surrounding districts yield an abundance of fruit. Pop. 8,734.

**Formic Acid** (Lat. *formica*, ant). The lowest in the important series of fatty acids. Its chemical formula is  $\text{CH}_3\text{CO}_2\text{H}$ . It was first obtained by John Ray in 1670 by distilling red ants with water, his observations being printed in the Philosophical Transactions of that year. Formic acid occurs in other animal and vegetable substances, but is now made by: (1) heating to  $60^\circ\text{C}$ . in a retort a mixture of sugar, water, manganese peroxide, and sulphuric acid; (2) by heating equal parts of anhydrous glycerine with oxalic acid and distilling the product. The liquid acid is colourless, and has a pungent, sour taste and odour.

**Formicivora** (Lat. *formica*, ant; *vorare*, to devour). Genus of passeriform birds of the family Formi-

cariidae—Ant-birds—natives of South and Central America. They have long, compressed and hooked beaks; the foot (*metatarsus*) is short and thick, and the outer and middle toes are joined towards their base.

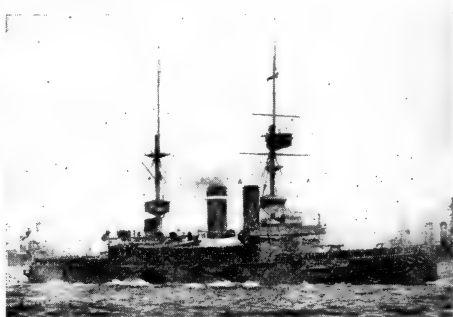
**Formidable.** British battleship, the first of her class sunk by a submarine in the Great War. She was launched at Portsmouth in 1898 and completed in 1901, her principal characteristics being: length 400 ft., beam 75 ft., displacement 15,000 tons, speed 18 knots, with an armament of four 12-in., twelve 6-in., and 18 12-pounder guns. She was torpedoed in the English Channel on Jan. 1, 1915. About 600 lives were lost, and 71 officers and men were saved.

**Formigny, BATTLE OF.** Fought between the English and the French, Apl. 15, 1450. To strengthen the English cause in France a force under Sir Thomas Kyriel was sent to Cherbourg. About 2,500 strong, it was joined in Normandy by another 1,000 men, and this army, having taken Valognes, moved to Formigny, not far from Bayeux. There it was met by a French force, and the English were routed.

**Form Letter.** Letter of which many copies are made, generally used for advertising purposes. Frequently they are printed so as to resemble a typewritten letter, the name and address being inserted afterwards, as far as possible in the same type and ink as the form letter. See Advertising; Mail Order.

**Formocyanine.** Name given to a British dye discovered in 1916. Researches were carried out by the university of Leeds, and two dyes, formocyanine and tolucyanine, were prepared, both of which are used in colour printing. See Colour Printing; Dyes.

**Formosa.** Island in the W. Pacific Ocean. It is "the beautiful island" of the Portuguese far-eastern navigators of the 16th



H.M.S. Formidable. The last photograph of the vessel, taken during the naval review, July 20, 1914

Cribb, Southea



Formosa. Map of the island surrendered by China to Japan in 1895

century, called by the Japanese Taiwan or Terrace Bay. It is 244 m. in length with a maximum width of 76 m. Separated from the mainland of China by the storm-swept Strait of Formosa, it is crossed by the tropic of Cancer.

An island of wonderful fertility and great natural beauty, it is sharply divided into two nearly equal portions. The western side, facing China, consists of highly cultivated plains; the eastern, of lofty forest-clad mountain ranges, which extend to the E. coast, where the island faces the open Pacific, with steep, perpendicular cliffs, rising to a height in some places of 6,000 ft. The mountains are inhabited by tribes of fierce savages of Malay or Negrito origin, who, since the island was surrendered by China to the Japanese after the war of 1894-95, are being gradually brought into subjection. The western half is inhabited by Chinese agricultural and industrial settlers, and their descendants, and by Japanese, the total population of the island being 3,698,918.

The chief products are rice, tea, sugar, salt, rattans, sweet potatoes, hemp, jute, indigo, and camphor. Its minerals are gold (alluvial), silver, coal, copper, petroleum, and sulphur. Economic timber, as yet almost untouched, may be said to be inexhaustible. It is the principal source of the camphor supply of the world. The climate is hot, damp, and malarious. In the N. there is a very heavy rainfall, and violent typhoons are frequent. The trunk rly. starts at Keelung, the chief harbour, passes Taihoku, the capital, Taichu, Tainan, the oldest city, and Takow to reach Hozan.

**Formosa.** Territory of Argentina, in the N.E. of the republic. It lies between the rivers Pilcomayo and Bermejo, with Paraguay on the E., the Gran Chaco on the S., and the prov. of Salta on the W. It includes part of the Gran Chaco. The interior contains forests and swamps, abounding in game. Area, 41,402 sq. m. The capital is Formosa, on the river Paraguay, a centre for agricultural produce, as well as for cattle, tobacco, and sugar. It has a port and a wireless station. Indians inhabit the interior. Pop. 20,458.

**Formosa.** Strait or channel separating the island of Formosa from China. It is about 150 m. broad and contains the 12 Pescadores Islands, the largest of which is Hokoto.

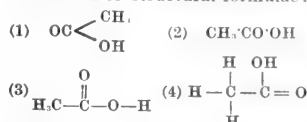
**Formula** (Lat. *forma*, little form). Prescribed form of anything. In mathematics formulae are the general expressions used in solving problems; thus  $a^2 - b^2 = (a - b)(a + b)$  is a formula. The word is most commonly used perhaps in chemistry. A collection of formulae in a book is called a *formulary*.

Chemical formulae are symbolical representations of the arrangement of the atoms within the molecule, the modes of the formation and decomposition of a compound, or the relation which the allied compounds bear to one another. Dalton, in 1808, devised a system of circles to represent atoms, grouping them together to show how compounds are made up.

Later Berzelius employed a system based on the atomic theory from which the modern usage has developed, owing to the need of devising means or expressing such facts as the relation of the atoms which enter into the composition of the molecules.

The various kinds of chemical formulae are best illustrated by reference to acetic acid. The molecular formula is  $C_2H_4O_2$ , indicating the atoms of which the molecule is composed. The empirical or rational formula is  $HC_2H_3O_2$ , which emphasises the

replaceable hydrogen of the acid. The following examples are constitutional or structural formulae:



These are intended mainly to express the relations or linkage between the bonds which determine the behaviour of the substance. No. 2 indicates that acetic acid is composed of the two compound radicals, methyl and carboxyl. Constitutional formulae are determined by experiment and indicate properties which a compound may be expected to possess. See Chemical Signs.

**Fornax.** One of Lacaille's southern circumpolar constellations. Its name means the chemical furnace. See Constellation.

**Forres.** Royal burgh and market town of Moray or Elginshire, Scotland. It stands on the river



Forres arms

Institute. An ancient monolith, named Sueno's stone, is said to have been placed here early in the 10th century. On Castle Hill was



Formosa. Natives of the Paiwan group. Above, man and woman of the Tsou group in elaborate head-dresses



Forres, Scotland. The High Street, with the Court House, built 1839, and, in front of it, the Market Cross, 1844

Valentine

a royal residence in the 12th century. Footwear, woollen goods, and chemical manures are manufactured. Forres is in a sheltered position at the foot of the Cluny Hills, and near by is the Cluny Hill hydropathic. Pop. 4,932.

**Forrest, JOHN FORREST, BARON (1847-1918).** Australian statesman and explorer. Born near Bun-



Baron Forrest, Australian statesman

Elliott & Fry

bury, W. Australia, Aug. 22, 1847, and educated at Perth, he became a state surveyor, 1865, and explored the interior of the continent. Surveyor-general of W. Australia in 1883, he became its first premier in 1890, a post which he held until 1901. He was knighted in 1891. He took part in the negotiations leading to the formation of the Commonwealth, and in 1901 became its first postmaster-general. He was minister of defence, 1901-3, of home affairs, 1903-4, and treasurer for four periods. He resigned in 1918, and was created a peer, the first Australian so honoured. His title lapsed on his death, Sept. 3, 1918.

**Forst.** Town of Prussia, in Brandenburg. It stands on the Neisse, 44 m. S. of Frankfort-on-Order. The main industry is the weaving of cloth. Pop. 33,875.

**Forster, HENRY WILLIAM FORSTER, 1ST BARON (b. 1866).** British politician. Born Jan. 31, 1866, he was educated at Eton and New College, Oxford, and represented both school and university at cricket. In 1892 he was elected M.P. for Sevenoaks division of



1st Baron Forster, British politician

Russell

1920, he was appointed governor-general of Australia.

**Forster, JOHN (1812-76).** British historian and biographer. Born at Newcastle, April 2, 1812,



John Forster, British historian

After C. E. Perugini

and educated at Newcastle grammar school and University College, London, he became, in 1833, the literary and dramatic critic of *The Examiner*, and edited *The Daily News* during 1846. From 1847-55 he edited *The Examiner*, resigning this post on his appointment as secretary to the commissioners of lunacy. From Nov., 1861, to 1872, he was commissioner of lunacy.

In addition to the two works by which he is best known, *The Life and Times of Oliver Goldsmith*, 1848, and *The Life of Dickens* (with whom he was most intimate), 1872-74, he wrote *Lives of the Statesmen of the Commonwealth*, 1836-39, *Arrest of the Five Members*, 1860, a *Life of Sir John Eliot*, 1864, and vol. i of a *Life of Swift*, 1875. His collection of MSS., books, and pictures forms the Forster bequest at the S. Kensington Museum. He died Feb. 1, 1876.

**Forster, WILLIAM EDWARD (1818-86).** British politician. Born at Bradpole, Dorset, July 11, 1818,

his parents were Quakers, and he was educated at a Quaker school at Tottenham. He entered business in Bradford and soon became a successful woollen manufacturer there. He found time also for public work; writing and lecturing made him known, and in 1859 he was par-

liamentary candidate for Leeds. He was unsuccessful, but in 1861 he was returned as Liberal M.P. for Bradford. He retained the seat throughout his life. In 1915 he became financial secretary to the war office in the Coalition government, in 1917 a privy councillor, and in Dec., 1919, when he resigned, was created a baron. He had sat for Bromley since 1918. In June,

liamentary candidate for Leeds. He was unsuccessful, but in 1861 he was returned as Liberal M.P. for Bradford. He retained the seat throughout his life.

In 1865 Forster joined the Liberal ministry as under-secretary for the colonies, but he was soon in opposition. In 1868 he became vice-president of the council in Gladstone's first ministry. He had already shown a lively interest in popular education, and it fell to him to frame and introduce the important Education Act of 1870. He showed great perseverance in getting it through the Commons, for the religious question aroused acute controversies and both sides criticised him for steering a middle course. He remained in office until 1874, and in 1880 returned thereto, this time to the difficult position of chief secretary for Ireland. He introduced a Coercion Act, and though his life was constantly in danger carried on his duties with absolute fearlessness.

In 1882 he resigned, as Gladstone released the political prisoners from Kilmainham. Henceforward his attitude towards Irish policy was critical, and it was not surprising when he declared against Home Rule. On April 6, 1886, he died at his London residence.

Forster was a convinced but independent radical, early urging reforms afterwards adopted, but he was never very docile in following others. He was something of an imperialist, and was never afraid of expressing his views. He married, in 1850, Jane Martha, eldest daughter of Dr. Arnold, and he adopted four children, his wife's nephews and nieces, who were known as Arnold-Forster. See *Life*, Sir T. Wemyss Reid, 1888.

**Forsterite.** Light - coloured variety of mineral olivine. It contains a small proportion of silicate of lime, and occurs in limestones altered by intrusion of igneous rock. See *Olivine*.

**Forsythia.** Genus of shrubs of the natural order Oleaceae. Natives of Japan and China, they have smooth, simple, or trefoil leaves, and scattered yellow flowers, abundantly produced in early spring, which makes the two species, *F. suspensa* and *F. viridissima*, favourites in European gardens. The genus is named after William Forsyth, an 18th century gardener.

**Fort** (Lat. *fortis*, strong). Diminutive of fortress. It was commonly used for fortified trading stations, and there were hundreds of these in N. America and in India. Some of these, e.g. Fort Duquesne, still retain the prefix, but others,



W. E. Forster, British politician

*e.g.* Ticonderoga, have lost it. Some rough shelter and protection was thrown up, and the fort served as a storehouse and rendezvous for the traders, being also in cases of attack a refuge for them. During the war between England and France the existing forts were strengthened and new ones erected, and many attacks made on them. The modern sense of fort is rather that of a part of a fortress. Thus Verdun and Liège were defended by rings of forts, each one having a distinctive name. See Fortification; Fortress.

**Fort, PAUL** (b. 1872). French poet. Born at Reims, he early migrated to Paris, where he founded the *Théâtre des Arts*, producing modern plays, and becoming a centre of the Symbolist poets. Issuing his early ballads as pamphlets, he published his first volume of *Ballades françaises* in 1897, and thenceforth produced one or more volumes annually, maintaining a remarkably high level. *Pron.* For.

Though master of varied lyric metres, he printed each verse as though it was a prose passage. His later volumes include *Chansons pour me consoler d'être heureux*, 1913; *Poèmes de France*, 1915; *Que j'ai de Plaisir d'être français*, 1917; *Chansons à la Gauloise*, 1919; *Les Enchanteurs*, 1919; *Barbe Bleu, Jeanne d'Arc et Mes Amours*, 1919. See *Six French Poets*, A. Lowell, 1915.

**Fortaleza.** Seaport of Brazil, capital of the state of Ceará. It stands on an open bay, near the mouth of the river Ceará, 350 m. N.W. of Pernambuco, with an anchorage two miles out. Although the harbour has been much improved in recent years, cargo has to be taken off the vessels in the roadstead and landed on the beach in surf boats. There is a trade in rubber, cotton, coffee, animal products, sugar, and drugs. Previous to 1823 it was called Ceará. Pop. 70,000.

**Fort Augustus.** Parish and village of Inverness-shire, Scotland. It is finely situated at the head of Loch Ness, on the Caledonian Canal, and is connected with Spean Bridge, 24 m. S., by a branch of the Highland Rly. The fort, built originally in 1716 and enlarged in 1730, was taken by the Jacobites in 1745, and recaptured a year later by William Augustus, duke of Cumberland, in whose honour it was named. Purchased by Lord Lovat in 1857, it was presented by him, in 1876, to the Benedictines, who transformed it into a monastery with college, hospital, and scriptorium, which in 1882 was raised to the rank of an abbey.

**Fort Beaufort.** Town of Cape Province, S. Africa. It is on the Kat river, 63 m. by rly. W.N.W. of King William's Town, and is an important ostrich-farming centre. Pop. 4,312.

**Fort Chabrol.** Name given to a house in the Rue de Chabrol, Paris, which was the scene of a remarkable siege in 1899. During the trial of Alfred Dreyfus (*q.v.*), Nationalists, Royalists, and Anti-Semites sought the opportunity for a rising, and Jules Guérin, an Anti-Semite leader, with 20 armed compatriots barricaded the Anti-Semite club in the Rue de Chabrol, and defied the authorities to capture them. Each man had a magazine rifle, revolver, and 300 rounds, and the house was provided with bullet-proof doors and shutters. The siege became a farce. The French government decided to reduce the garrison by starvation, and "Fort Chabrol" was surrounded by a battalion of the Republican Guard. No one but doctors, who attended the garrison, were allowed to pass down the street; the water supply was cut off, and sewer-men blocked up the drains to prevent the garrison digging their way out. After 38 days the "fort" capitulated without anyone being killed or injured.

**Fort-de-France.** Town of Martinique, French W. Indies, formerly known as Fort Royal. On the W. coast, 15 m. S.E. of St. Pierre, it is the capital and chief commercial centre of the colony. Its commodious harbour is fortified, and it has an arsenal, a college, a library, and several hospitals. It is the seat of the governor-general of the French West Indies. In the chief square there is a statue of the Empress Josephine. In Aug., 1891, the town was laid in ruins by a cyclone. Pop. 26,399.

**Fort Dodge.** A city of Iowa, U.S.A., the co. seat of Webster co. On the Des Moines river, 86 m. by

rly. N.N.W. of the city of Des Moines, it is served by the Chicago Great Western and other rlys. It contains Tobin College and other educational institutions, a public library, and several parks. In the neighbourhood gypsum, glass sand, limestone, and coal are worked. The city's charter dates from 1869. Pop. 21,040.

**Fort Donelson,** BATTLE OF. Federal victory in the American Civil War, Feb., 1862. Fort Donelson and Fort Henry, situated 12 m. apart on the Kentucky-Tennessee border, were the two most important defences of the West. Occupied by the Confederates in 1861, Grant immediately recognized the necessity of capturing them, and in Feb., 1862, succeeded in seizing Fort Henry, although most of its defenders had escaped to Fort Donelson.

Moving against the latter with a combined naval and military force, Grant received a serious check, and on Feb. 15 the Confederates made an attempt to retreat to Nashville, but were stopped by Grant. The following day Buckner, in command of the fortress, asked for an armistice in which to settle terms of capitulation. Grant demanded unconditional and immediate surrender, to which Buckner agreed. This reply of the Federal general and the play upon the initials of his Christian names, U. S., gave him the sobriquet of Unconditional Surrender Grant.

**Fort Duquesne.** Eighteenth century stronghold at the junction of the Monongahela and Allegheny rivers. During the French and English disputes about the sovereignty of the land W. of the Alleghenies, George Washington recommended the spot as a suitable site for a fort, and in 1754 the English began to construct one. The French drove them away and themselves completed the work, calling it Fort Duquesne, after the French governor of that name.

Attempts by Washington, and in 1755 by General Braddock, failed to recover it; but in 1758 General John Miles succeeded. He arrived there to find that it had been abandoned and destroyed by the French. The English then began to build a new fort, and this, named Fort Pitt, grew into Pittsburg, the great steel-working centre of Pennsylvania.



Fort Augustus, Inverness-shire. The abbey and college of S. Benedict on the shore of Loch Ness

Valentine

**Forte.** Italian term used in music, meaning strong or loud. It is sometimes represented by the abbreviations *for.*, or *f*. Its superlative, meaning very loud, is *fortissimo*, shortened to *ff* or *fff*, or very rarely *ffff*. See Musical Terms.

**Fortescue.** River of W. Australia. It rises in the Hammersley Range, flows in a N.W. course of 250 m., and discharges into the Indian Ocean in lat. 21° 10' S., a few miles below Cape Preston.

**Fortescue, EARL.** British title borne since 1789 by the family of Fortescue. In 1721, Sir Hugh Fortescue, a member of an old Devon family, obtained the barony of Clinton, and was made Baron Fortescue and earl of Clinton. When he died, in 1751, his brother Matthew became Baron Fortescue, and Matthew's son, Hugh, the 3rd baron, was made Viscount Ebrington and Earl Fortescue in 1789. The 2nd earl was lord-lieutenant of Ireland from 1839-41, and the 3rd earl held minor offices in the Liberal ministry between 1846 and 1851. The earl's estates are in Devonshire, and his eldest son is called Viscount Ebrington.

**Fortescue, GRANVILLE ROLAND** (b. 1875). American soldier and journalist. Born in New York, Oct. 12, 1875, and educated at the university of Pennsylvania, he served with the Rough Riders in Cuba, 1898; as lieutenant of volunteer infantry in the Philippines, 1899-1901; in the cavalry, 1902, and graduated at the U.S. Staff College in 1904. Retiring from the U.S. army in 1906, he acted as The Standard's special correspondent with the Spanish army in the Riff War, 1909; and in the Great War as correspondent of The Daily Telegraph on the western front. He is the author of *At the Front with Three Armies*, 1915; *Russia, The Balkans, and The Dardanelles*, 1915; and *What of The Dardanelles?*, 1915.

**Fortescue, SIR JOHN** (c. 1394-1476). English judge and writer. The son of another Sir John Fortescue, he belonged to the Devon family of that name. Born at Norris in Somerset, he was educated at Exeter College, Oxford, and became a lawyer in London. In 1442 he was made chief justice of the king's bench, and he held the post until Henry VI lost his throne in 1461. He went abroad with Queen Margaret of Anjou in 1463, and was with her and her son Edward for some time, but in 1471 he was pardoned by Edward IV. Fortescue is best known by his writings. His treatise on the laws of England (*De Laudibus Legum Angliæ*) was published

after his death, and several times since. He also wrote a book, the earliest of its kind, now known as *The Governance of England*. This was first published in 1714 as *The Difference Between an Absolute and a Limited Monarchy*, and under its other title, with an introduction by C. Plummer, in 1885.

**Fortescue, JOHN WILLIAM** (b. 1859). British military historian. Born Dec. 28, 1859, a younger son of the 3rd Earl Fortescue, he was educated at Harrow and Trinity College, Cambridge. He was private secretary to the governor of New Zealand, and a captain in the Devon Yeomanry, but devoted much time to military history. In 1899 appeared the first volume of his *History of the British Army*, and eight other volumes appeared at intervals until 1920, the story being then taken down to 1815.

This is the most complete history of its kind, a careful survey of the subject from the earliest times, and particularly valuable for the 18th century. In 1905 Fortescue was made librarian at Windsor Castle. He also wrote a *History of the 17th Lancers*, 1895, some novels, an animal study, *The Story of a Red Deer*, 1897, and wrote the article on *The British Army* in this work. He was lecturer on military subjects at the universities of Oxford, Cambridge, and London. See port., p. xxi, vol. i.

**Fortescue, Miss** Stage name of May Finney, British actress. She made her stage debut as Lady Ella, in *Patience*, at The Opéra Comique, London, April 23, 1881. A notable Celia in *Iolanthe*, at The Savoy, 1882, she appeared as Dorothy in *Dan'l Druce*, at The Court, 1884.



Miss Fortescue as Julia in *The Hunchback*



Sir John Fortescue.  
English judge  
After W. Faithorne

Lyons; Galatea in *Pygmalion* and *Galatea*; Juliet; Rosalind; Lady Teazle in *The School for Scandal*; Fedora; Hypatia; the duchess of Strood in *The Gay Lord Quex*; Lady Faringford in *The Return of the Prodigal*; the duchess of Braceborough in Mr. Hopkinson; Mrs. J. K. Rotterford in Billy's Bargain; Lady Bagley in *Our Mr. Hepplewhite*, Lady Emily in *Humpty Dumpty*; Mrs. Devlin in *Betty at Bay*; appearing also at Drury Lane in *The Best of Luck*. She visited the U.S.A. in 1886, and Germany in 1909.

**Fort Garry.** Former post of the Hudson Bay Co., erected 1835, on the site of which Winnipeg grew up. In 1873 the city was incorporated under the latter name. Old Fort Garry Gate, a castellated gate at the end of Broadway, is all that remains of the fort. A mounted unit of the Canadian army known as the Fort Garry Horse distinguished itself at Cambrai, Nov. 20, 1917. See Winnipeg.

**Fort George.** Fortress of Inverness-shire, Scotland. It stands on Moray Firth, 12 m. N.E. of Inverness, and was erected after the rebellion of 1745 to accommodate 2,000 men. There is ferry communication with Fortrose on the opposite shore of the Firth.

**Forth.** River of Scotland, which, flowing into the N. Sea, forms as its estuary the Firth of Forth. The meeting of the hill streams Duchray Water and Avon-dhu, near Aberfoyle, in Perthshire, forms the Forth, which flows through Perthshire, Stirlingshire, and Clackmannanshire, mainly in an easterly direction. The total length as far as Alloa is about 53 m. Tidal to a point about four m. above Stirling, the river is navigable for 300-ton vessels as far as Alloa, for 100 tons to Stirling. Its chief tributaries are the rivers Teith and Devon and Allan Water. In the Carse of Stirling its course is extraordinarily sinuous, forming the so-called Links of Forth.

**Forth, FIRTH OF.** Name given to the estuary of the river Forth, on the E. coast of Scotland. The Firth begins at Alloa, and stretching to a line drawn S. from Fife Ness, being thus about 51 m. long and varying in width from one to 17 m. The chief islands are Inchkeith, Inchcolm, Cramond Island, and the Bass Rock, and Leith, Granton, Grangemouth, Alloa, Burntisland, and Methel are the chief harbours and fishing ports along both coasts. The Firth is spanned at Queensferry by the Forth Bridge, but a ferry service is maintained there and between Granton and Burntisland.



The Firth has great strategic importance. During the Great War it was a base of the Grand Fleet; many defences, forts, protective booms, etc., were constructed, and in the Firth off Inchkeith the German fleet surrendered, Nov., 1918. See Rosyth.

**Fort Hall.** Settlement in Kenya Colony, E. Africa. It is situated between Nairobi and Mount Kenya, and is 4,500 ft. above sea level. A branch line from the Uganda Rly. has reached the Thika river (32 m.) and is to be continued to Fort Hall.

**Forth and Clyde Canal.** Waterway extending from Grangemouth, on the Forth, to Bowling, on the Clyde. It was constructed between 1768-90 at a cost of £330,000, and has a length of 39 m. Since 1867 it has been the property of the Cal. Rly, but no great volume of traffic uses the canal regularly.

**Forth Bridge.** Railway bridge in Scotland, begun in 1882 and opened for traffic in 1890. By its construction across the Firth of Forth a long detour of the rly. westward was obviated and direct connexion between Edinburgh and the N. side of the Firth established, while its clear height of 150 ft. and long spans enable vessels of any size or type to pass below it.

From the engineer's point of view, it marked an epoch in the history of bridge building. Its enormous clear spans of 1,710 ft. between supports were rendered possible by the use of steel and by the cantilever design of the superstructure. The bridge, which carries two railway tracks, is slightly over  $1\frac{1}{2}$  miles in length. There are three main piers from which the six cantilever arms rise and project, the ends of which, in the main spans, support and are connected by long girder spans. The height of the cantilevers, over the piers, above water level is 361 ft. The main compression members of the cantilevers consist of steel tubes in some cases 12 ft. in diameter.

The extremities of the end cantilevers rest upon masonry piers whence the rly. is carried to the shore on approach viaducts comprising a number of comparatively small steel bridge spans and masonry arches. Each main river pier consists of four circular masonry supports resting upon caissons 70 ft. diameter, and sunk to a depth of from 70 ft. to 90 ft. below water level. The structure, designed by John Fowler and Benjamin Baker, comprises 51,000 tons of steelwork and 142,000 cubic yds. of masonry, cost nearly £3,000,000, and occupied seven years to construct. See Bridge, illus. and plate.

## FORTIFICATION: PAST AND PRESENT

Sir George G. Aston, K.C.B., Author of *War Lessons, New and Old*  
The principles of fortification are here outlined. The article *Fortress* should also be read, as well as those on *Strategy, Tactics, and War*. See also *Artillery* and articles on *Antwerp: Metz; Verdun*, and the great fortresses of the past

From the siege of Troy the history of the world's wars is filled with heroic tales of human ingenuity displayed in the attack and defence of fortified places. Fortifications confer the power of prolonged resistance upon forces which are inferior in numbers, mobility, equipment, or moral to their enemies. Thus Wellington in the Peninsula took shelter behind the celebrated lines of Torres Vedras when his army required a safe refuge for recuperation, and in the Great War of 1914-18 both sides made use of the art of the engineer to enable their armies to hold their own on the defensive while collecting men and munitions for a serious offensive.

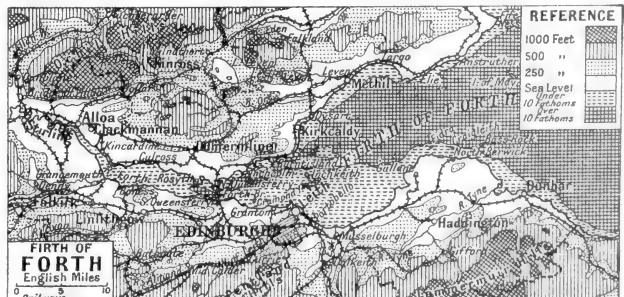
The advantages conferred upon armies by fortifications are temporary. Francis Bacon wrote truly that "walled towns, stored arsenals, and armouries . . . ordnance, artillery, and the like, all this is but a sheep in a lion's skin, except the breed of the people be stout and warlike." It is not fortifications but men that decide the fate of nations. Fortifications which afford all-round defence to their garrisons are called fortresses. While these can be of great value if skilfully applied, they sometimes have a harmful effect upon the commanders of field armies. Bazaine's army, sheltering behind the defences of Metz, took no further active part in the Franco-Prussian War, and Sir John French was sorely tempted to seek the protection of the fortress of Maubeuge after the battle of Mons.

Fortifications may take the form of "permanent" works, erected in time of peace, or of temporary "field" defences, constructed when and where they may be required in time of war. At certain periods in European history, when

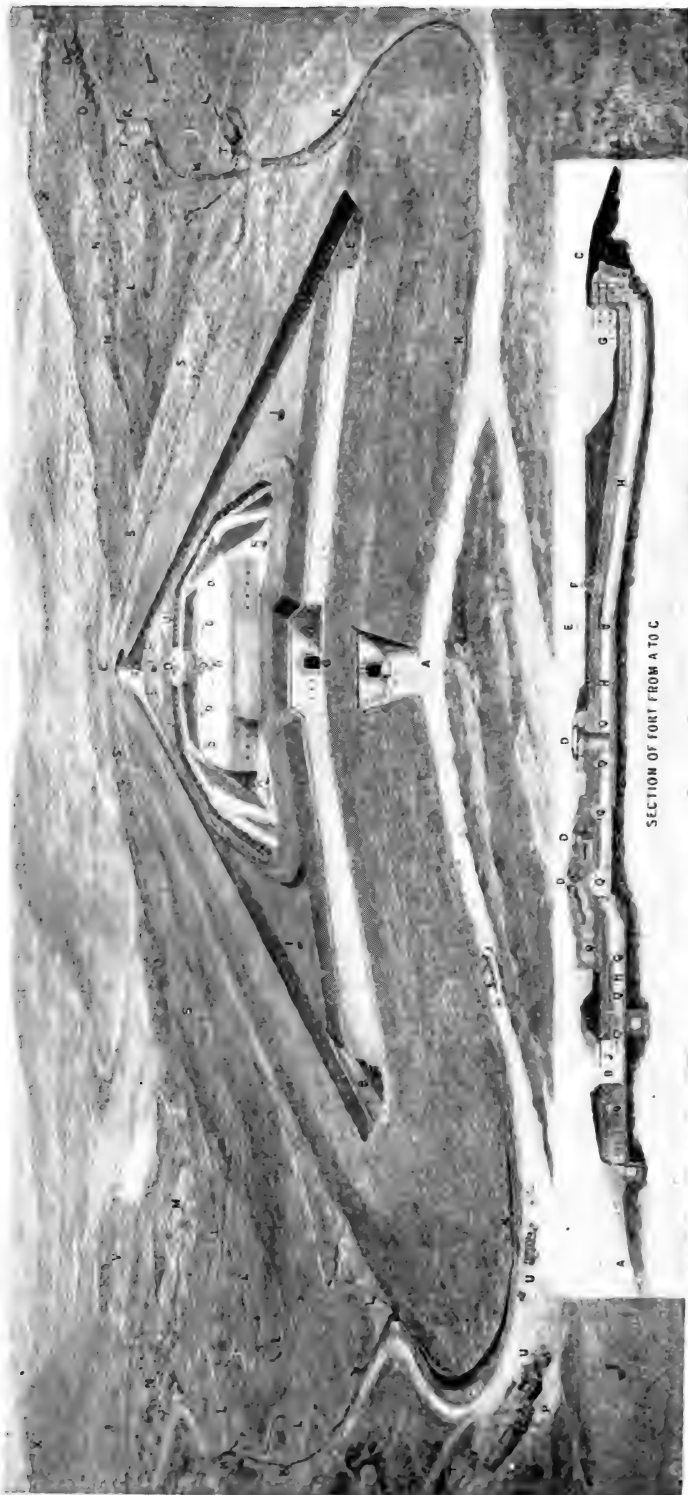
provisions were scarce and means of communication bad, the issue of a war was often determined by the attack and defence of fortified places, and the history of war became a history of sieges. Large quantities of foodstuffs were collected in great fortresses where the people took refuge while the attackers tried to pass the fortified lines in order to reach them. If surprise, assault or bombardment failed, the attacking forces were obliged to resort to regular siege, approaching by cunningly devised forms of entrenchment called "parallels" and "saps," and by mining galleries, at the same time "investing" the place to starve out the garrison.

When the mobility of armies was increased by improvements in roads and wheeled transport, a complete change came over the nature of land warfare, and the value of fortresses now lies in the influence they can exert upon the operations of field armies. If placed where important roads and rlys., needed by an invading army, converge towards the crossings of obstacles such as rivers or marshy country, a well-placed fortress can delay an invader's advance. The delay imposed upon von Kluck's army by the forts of Liège in 1914 was one of the factors enabling Manoury's army to assemble N. of Paris in time to play an important part in the victory of the Marne.

Again, the need to detach forces to guard the communications of an invading army against the garrisons of fortresses may seriously reduce its strength in decisive battle. Von Kluck and von Bülow, having detached forces to watch the Belgian army in Antwerp and the garrison of Maubeuge, were too weak to perform their task in France.



Firth of Forth. Layered map showing the heights of the surrounding hills and depths of the estuary



Bird's-eye and sectional diagrams showing : A, outer gate with drawbridge ; B, ditch with wing entanglements ; C, inner gate with drawbridge ; D, howitzer cupolas ; E, quick firing gun cupolas ; F, observation and searchlight cupola ; G, countercarp gallery with machine guns commanding ditch ; H, gallery from gate through fort ; I, infantry positions ; K, rifle trench ; L, fire trenches ; M, infantry redoubts ; N, field guns ; O, howitzers ; P, light rifle battery ; Q, doors to barracks and magazines ; R, machine gun positions ; S, wire entanglements ; T, bomb proof shelters ; U, motor battery ; V, main line of communication with the rear ; W, small fort ; X, two forts forming triangular group with central fort

SECTION OF FORT FROM A TO C

FORTIFICATION: DIAGRAM OF FORT DESIGNED BY THE BELGIAN ENGINEER, H. A. BRIALMONT

While the functions performed by fortifications in land war remain fairly constant, their nature has changed with the increased mobility of heavy ordnance used in the attack. In the days of bows and arrows a high wall was a formidable obstacle. With the introduction of ordnance the steep-sided revetted ditch replaced the exposed wall, and various devices—"bastions," "caponiers," and the like—were introduced to bring a flanking fire to bear upon assailants who might effect a lodgment in the ditch. The garrisons were protected by large mounds of earth called "ramparts" and "traverses," under which they found shelter in "casemates" when not holding the lines of "parapet" surmounting the ramparts.

With the increased range and rapidity of fire of weapons of defence, barbed wire entanglements, which give full play to such weapons, replaced deep ditches as obstacles. Then came the tank for crossing barbed wire, and so the competition proceeds, and will proceed, between inventions for defence and attack. Invisibility, from the ground surface or from the air, affords better protection to garrisons than earthworks or armour, and underground "dug-outs" have replaced conspicuous ramparts of earth piled up above the surface. Heavy ordnance is no longer considered secure if mounted in visible fixed positions, and the tendency in modern fortification is to meet the mobility of siege ordnance by similar mobility in the ordnance of the defence.

The functions performed by fortification in sea warfare differ materially from its functions in war on land. Only in exceptional cases, such as in narrow straits like the Dardanelles or in sea canals like that of Panama, can ordnance mounted in forts exercise any direct effect upon the movements of the war vessels which decide the issue of a naval war. War vessels, especially those of a weaker naval power or of a stronger power compelled to maintain detached forces in distant seas, require defended harbours as bases from which to work, and fortification, so applied, may exercise a strong, though indirect, influence upon the issue of a sea-war.

War vessels being built to fight each other, not to fight forts, and ships being conspicuous targets, guns mounted on fixed platforms on shore have so many advantages over those mounted on moving platforms at sea that no fortress on the sea coast has fallen to sea attack in modern times. Port

Arthur in 1894, Wei-Hai-Wei in 1895, Santiago de Cuba in 1898, Port Arthur again in 1905, and Kiaochau in 1914 were all taken by armies.

Commercial harbours are sometimes fortified as places of refuge for merchant shipping, but safety at sea, rather than in harbour, is the condition needed for the security of the vessels carrying the trade of a community depending upon sea commerce for existence. See Text Book of Fortification, Royal Military Academy, 1893; Fortification, Sir G. S. Clarke, 1907. See also Bangalore and Cupola, *illus.*

**Fortin** (Fr., little fort). Small detached fort. It may be either one of a group or part of a general fortification.

**Fort Jameson.** Settlement in N.E. Rhodesia. On the Tanganyika plateau, it is about 300 m. N. of Tete by road and 125 m. W. of Lake Nyasa. It was until 1910 the headquarters of the administration of N.E. Rhodesia.

**Fort Johnston.** Settlement of Nyasaland, Central Africa. It stands 6 m. south of Lake Nyasa, and about the same distance from Lake Malombe or Pamalombe.

**Fort Mruli.** Town of Uganda, Central Africa, the former capital of the district of Unyoro. It stands on the Nile, 200 m. N.N.E. of Entebbe, at an alt. of 3,500 ft.

**Fortnightly Review.** THE London monthly review first published as a fortnightly, May, 1865, under the editorship of George Henry Lewes. John Morley became editor in 1867, and made it a monthly. He was succeeded by T. H. S. Escott (1882-88), Frank Harris (1888-93), and W. L. Courtney. Its contributors have included Tyndall, Herbert Spencer, Huxley, Leslie Stephen, Walter Pater, F. Brunetiere, Tolstoy, Edmund Gosse, Swinburne, Frederic Harrison, Prof. Dowden, J. L. Garvin, and H. G. Wells.

**Fort Pearson.** Fort erected at the mouth of the Tugela river, Natal, during the Zulu War of 1879.

**Fort Portal.** Chief centre of the Toro district, Uganda. It is an important missionary station and native town situated about 25 m. N.W. of Mt. Ruwenzori. Pop. 25,000, of whom about 50 are Europeans.

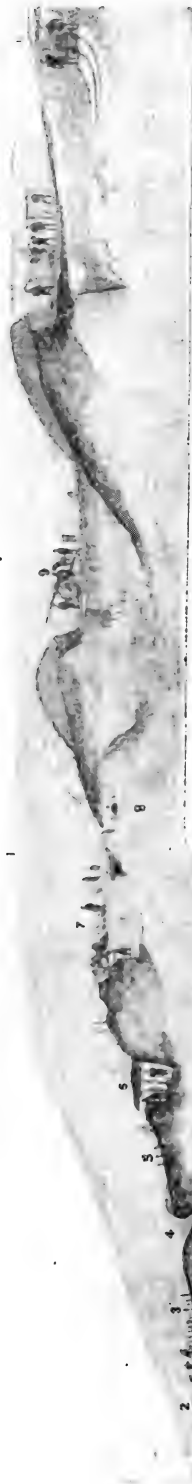
**Fortress** (Lat. *fortis*, strong). Military position, sited and equipped so as to provide a point of resistance in case of attack, and act as a rallying point for troops who may be compelled to fall back from more exposed positions. Fortresses have been a feature of all warlike operations from the

earliest times, the simplest being merely enclosed by a palisade or zareba such as are still found among aboriginal peoples. The baileys of the Saxons were usually of this nature, generally situated on a hill or artificially constructed mound and enclosing the huts in which the inhabitants lived. Dwellers in the surrounding country repaired to these strong points in time of war. The Romans usually employed concentric mounds and ditches to protect their camps, and in many instances the Saxon baileys utilised these older defences as outposts to the palisaded camp.

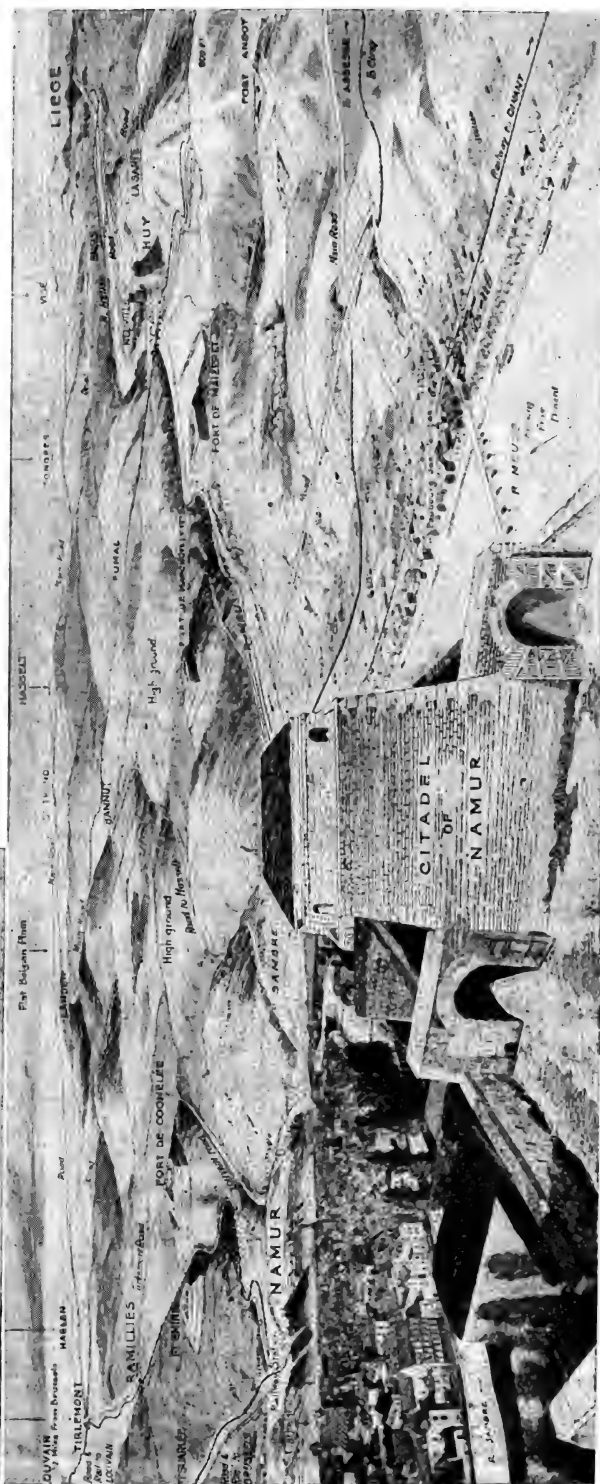
With the coming of the Normans the fortress was elaborated, but wood remained the chief material employed in the construction for something like a century, when stone became the general material. The Norman castle usually consisted of a large walled space—protected by a moat in suitable localities—which could only be entered through a strongly defended gate. Its general plan was maintained for many centuries, improvements in detail being made as military science progressed, as in the provision of corner towers to bring flanking fire to bear along the walls, machicolation of the latter and generally strengthened construction.

With the advent of artillery as an effective weapon, the use of fortresses of this nature became practically obsolete, although they played a part in the Wars of the Roses and even in the English Civil War. During this period it had become the practice to fortify important towns by walling them in, the walls being similarly constructed to those of the courts of castles. To enable such fortresses to withstand artillery fire, the walls were faced and backed up with mounds of earth, but the progress in gun construction and the use of explosives in mining and sapping rendered them only capable of temporary resistance. The general principle of construction, that is, a line of ramparts closely encircling the position to be defended, persisted until towards the close of the 18th century, when, in addition, an outlying circle of forts was constructed in such a way that the intervening country could be kept under fire from their guns.

In modern practice it is usual to equip as fortresses the centres of national, industrial, and military resources if liable to attack, strategic centres, lines of communication where they cross frontiers, important river crossings and railway junctions. The girdle of forts



Sectional diagram of a fort, showing 1. fort seen from side; 2. attacking party; 3. wire entanglements; 4. fossage; 5. wire entanglements; 6. infantry position; 7. held guns; 8. flanking machine guns; 9. siege guns; 10. howitzers; 11. communication trench with light etc.



Diagrammatic panorama from the Citadel of Namur, showing the disposition of the six forts to N.E. and S.E. of the city; three others complete the circle which the Germans attacked in 1914

# FORTRESS: FEATURES OF DEFENSIVE OPERATIONS IN OPEN WARFARE

should be sufficiently distant to prevent the enemy from bombarding the defensive point, which becomes essentially a military camp. The forts themselves should be constructed of reinforced concrete not less than 12 ft. thick, and the surrounding ground constructed as glacis so that an infantry attack will find no cover in the immediate vicinity. Searchlights form an essential part of the equipment, and only light guns are mounted in the forts, the heavier armament being in masked batteries some distance away. The general arrangement should be such that if one fort in the girdle is taken the neighbouring ones can sweep the intervening ground, and prepared infantry positions should be arranged between the forts. An enceinte nearer the central position is desirable, but it cannot be regarded as a line of resistance, but in the event of a break through may delay the enemy whilst the centre is evacuated. *See* Castle.

**Fortrose.** Royal, mun. and seaport town of Ross and Cromarty, Scotland. It stands on the Moray Firth, 9 m. N.E. of Inverness, on a branch of the Highland Rly. There is a good harbour, and the fine scenery, bathing facilities, and golf links attract many visitors. Fortrose was formerly the seat of the bishops of Ross, but the episcopal palace and cathedral were destroyed by Cromwell, who built his fort at Inverness with the stones. There is ferry communication across the firth with Fort George. Market day, Friday. Pop. 976.

**Fort Rosebery.** Settlement of N. Rhodesia. It is situated about 45 m. W. of Lake Bangweulu. A former settlement of this name was on the Luapula river, about 60 m. N.W. of the new township and 50 m. N. of the Johnston Falls, in the S.E. of the Belgian Congo.

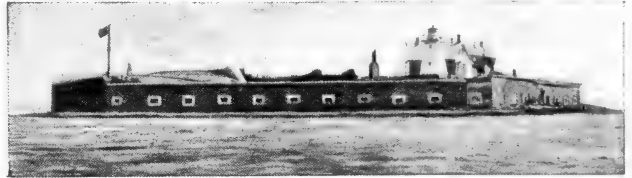
**Fort Royal.** Former name of the town of Martinique, French W. Indies, now known as Fort-de-France (*q.v.*).

**Fort St. David.** Ruined fort of Madras, India, in the S. Arcot district. It is on the Coromandel coast, less than 2 m. E. of Cuddalore New Town. At one time the site of Dutch and French settlements, the fort was bought by the English in 1690, together with the land within the radius of a "random shot of a great gun." The gun was actually fired, the shot indicating the extent of the boundaries. The name is supposed to have been given to the fort by a Welsh governor. The fort was captured by the French in 1758, who demolished the fortifications,

but, after changing hands again twice, it was finally restored to the English in 1785.

**Fort Smith.** City of Arkansas, U.S.A., one of the co. seats of Sebastian co. It stands on a great bend of the Arkansas river where it forms the W. frontier of the state, and is served by the St. Louis and San Francisco and other rlys. It contains a fine court house, a public school and other educational establishments, and a public library. Standing in an agricultural, coal, and natural gas region, it is a trading centre for coal, cotton, livestock, and corn, and manufactures furniture, cotton goods, bricks, refrigerators, and lumber products. Settled in 1838, it was incorporated in 1842 and became a city in 1886. Pop. 29,390.

**Fort Sumter.** Fort in S. Carolina, U.S.A. It stands on an island



Fort Sumter. The island fortress at the entrance to Charleston Harbour, the scene of fighting in the American Civil War

at the entrance to Charleston harbour, 3 m. S.E. of Charleston. It was bombarded by the Confederates, April 12, 1861, and surrendered the following day, the action immediately leading to the opening of the Civil War. In April, 1863, it was violently bombarded by the Federal fleet and rendered practically untenable.

**Fortuna.** In Roman mythology, the goddess of chance or good luck. There were several temples in Rome erected in her honour, but the most famous seats of her worship were Antium and Praeneste. She is sometimes called *Fors Fortuna*. In art she is represented with a rudder as symbol of her guidance of things, also with a cornucopia as a symbol of the prosperity she brought to mankind.

**Fortunate Isles.** Alternative name for the Islands of the Blessed, or the Elysian Fields, of early Greek mythology. They were supposed to be at the edge of the earth, and were vaguely spoken of as beyond the Pillars of Hercules, i.e. the Straits of Gibraltar. It has been generally accepted that the Canary Isles are the Fortunate Isles of the ancients. Ben Jonson produced a masque entitled *The Fortunate Isles* in 1626. *See* Elysium.

**Fortunatus.** Character of a folk-tale found among many different races. It first appeared in

print in a German form in 1509. Fortunatus is possessor of an inexhaustible purse, a wishing cap, and other marvels in different variants of the tale. The moral goes to show the little value to be put upon material treasures. The story was dramatised in Germany by Hans Sachs, 1553, and in England by T. Dekker, 1600. One named Fortunatus succoured the Apostle Paul.

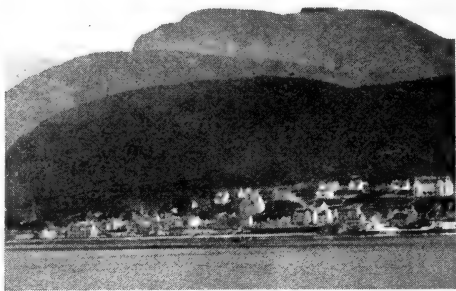
**Fortunes of Nigel.** THE. Fifteenth of the Waverley novels, published in May, 1822. In it Sir Walter Scott followed his masterly portraits of Mary Stuart and Elizabeth Tudor with an equally brilliant character-study of James I, and supplied vivid pictures of early 17th century London, from Alsatia to the Court. Nigel Olifaunt, Lord Glenvarloch, the young Scottish nobleman who comes south to petition the king; his devoted ser-

vitor, Richie Moniplies; the profligate Lord Delgarno; the crabbed old courtier Sir Mungo Malagrowther; "Jingling Gordie" Heriot, the wealthy goldsmith; Margaret Ramsay, the modest but courageous heroine, and the unhappy ship-chandler, John Christie, are memorable characters in the work.

**Fortune-telling.** Revelation by non-rational processes of what is to befall a person in the future. As one of the principal aims of divination it is traceable from its first recorded manifestations in ancient Babylonia into early China and India. Thence it was brought across medieval Europe by the gypsies, who are recorded by Pepys to have practised the art at Lambeth under society patronage in 1688. As a modern superstitious survival it is associated with palmistry, astrology, crystal-gazing, lot-casting by cards or otherwise, and subjective processes.

The alien origin of fortune-telling in Britain is confirmed by the fact that it is not a common-law offence. Its punishment as a form of witchcraft by death, under a statute of 1563, was reduced by the Witchcraft Act, 1735, to imprisonment for one year and the pillory. Under the Vagrancy Act, 1824, any person who undertakes to tell fortunes, or uses any subtle craft, means or device, by palmistry





Fort William, Scotland. The town, with Ben Nevis in the background, viewed from Loch Eil

Hardie

or otherwise, to deceive and impose upon any person, is liable to imprisonment as a rogue and vagabond. This Act was extended to Scotland in 1870, and the first conviction there, in 1877, was quashed on the ground that the plaintiff did not set forth that the pretence was with intent to deceive. In the United States fortune-tellers are usually classed by statute as disorderly persons, liable to arrest and summary examination. See Divination; Palmistry.

**Fortuny y Carbo**, MARIANO JOSÉ MARIA (1838-74). Spanish painter. Born at Reus, Catalonia, June 11, 1838, he studied at Barcelona Academy and at Rome. In 1859 he accompanied General Prim in his Moroccan expedition, and painted a large picture of The Battle of



Fortuny y Carbo, Spanish painter

Tetuan; but most of his life was passed at Rome or Paris. Through the firm of Goupil Bros., he obtained a large clientèle for his pictures of Spanish and Moorish genre. He died Nov. 21, 1874.

**Fort Wayne**. City of Indiana, U.S.A., the co. seat of Allen co. At the confluence of the St. Joseph and St. Mary rivers, which here merge into the Maumee river, it is 105 m. N.E. of Indianapolis and is served by the Lake Shore and Michigan Southern and other rlys. It contains a fine court house, a U.S.A. government building, Concordia College, a state school for weak-minded youths, a public library, and several hospitals and parks. An important rly. and trading centre, it has rly. workshops, flour mills, foundries, and machinery, chemical, piano, and soap factories. On the site of a fort built in 1794, Fort Wayne received a city charter in 1839. Pop. 75,220.

**Fort William**. Town, police burgh, and tourist resort of Inverness-shire, Scotland. It stands on the E. shore of Lower Loch Eil, at the foot of Ben Nevis, 65 m. S.W. of Inverness, on a branch of the N.B. Rly. The fort, erected by General Monk in 1655 and rebuilt by General Mackay in 1690, successfully withstood a siege by the Jacobites in 1715 and 1746; it was dismantled in 1860. Fort William is a starting point for the ascent of Ben Nevis (*q.v.*). The chief industry is distilling. Pop. 2,002.

**Fort William**. Port and city o. Ontario, Canada, in Algoma dist. It stands at the head of Lake Superior, on the left side of the Kaministiquia river; its importance being due to its position between E. and W. Canada. It is 420 m. E.S.E. of Winnipeg, and is served by three transcontinental lines of rly.—C.P.R., G.T.P.R., and C.N.R. It has a street rly. which goes to Port Arthur, 4 m. away. Steamers ply from here to the ports on the Great Lakes and the St. Lawrence, and there are immense elevators to handle grain brought from the W.



Fort William, Ontario. Kaministiquia river, looking east from the C.P.R. passenger docks

In addition to its shipping, for which there is 28 m. of deep-water frontage, the city has flour mills, iron foundries, and other industries. Fort William has electric light, and water power in abundance, churches, schools, hospitals, several hotels and public parks, a city hall and a court house. It was founded in 1801 as a Hudson Bay trading port. Pop. 16,499.

**Fort Worth**. City of Texas, U.S.A., the co. seat of Tarrant co. On Trinity river, 173 m. N.E. of Austin, it is served by the Missouri, Kansas and Texas and other rlys. It contains a number of educational and other institutions, including Texas Women's College, formerly

the Polytechnic College, the Fort Worth medical college, and Texas Christian university. There are besides a public and other libraries, a large number of churches, and a fine system of parks.

The centre of an agricultural and stock-rearing district, the city has large packing establishments and stockyards, and manufactures clothing, cotton, chemicals, furniture, and carriages. The city occupies the site of a fort erected in 1849, and was incorporated in 1873. Pop. 109,595.

**Forum**. Among the ancient Romans, any open space used for public business. More particularly the term was applied to the open space in Rome, an irregular oblong in shape, lying between the Palatine and Capitoline hills, known as the Forum Romanum. Here the assembly of the people met; here magistrates and others addressed them from the tribunal or *rostra*. Adjoining were the Curia or senate house, the Basilica Julia and Basilica Aemilia, the temples of Julius and Vesta. Along one side the Sacra Via led to the Capitol (*q.v.*).

With the growth of the city other fora were added; the Forum Julium by Julius Caesar, the Forum Augustum, and the Forum Pacis, where Vespasian erected a temple of Peace, containing spoils from the temple of Jerusalem. The Forum Trajanum, erected by the emperor Trajan, surpassed all others in size and splendour, and remains

the greatest monument of Roman architecture. Its most conspicuous feature was the column of Trajan, erected by the emperor in commemoration of his victories. See Rome; consult also The Roman Forum, C. Hülsen, Eng. trans. J. B. Carter.

**Forum**, THE. New York quarterly review of politics, finance, science, literature, and education. Founded as a monthly in 1886, to afford publicity to rival opinions, it became a quarterly in 1902. Under the editorship (1897-1907) of J. M. Rice, founder of the American Society of Educational Research, it promoted reforms in the American educational system.

**Forum Appii** (mod. Foro Appio). Ancient town of Latium, on the Appian Way (*q.v.*). It stood amid the Pontine Marshes, 42 m. S.E. of Rome, and near a canal which extended S. to near Terracina. The apostle Paul passed through the town on his way to Rome.



The ruined Forum as it is at the present day, looking north-west towards the Capitol. Above, the same view with the buildings reconstructed as they appeared in Imperial times, showing a religious procession passing the temple of Castor and Pollux. Beyond the temple on the left is the Basilica Julia

**FORUM: THE CENTRE OF THE LIFE OF ANCIENT ROME**

**Foscari, FRANCESCO** (1373-1457). Doge of Venice. After holding various offices in the republic



Francesco Foscari,  
Doge of Venice  
After Gentile Bellini

he was elected doge in 1423. Ambitious to extend Venetian power, he took an active part in the politics of the mainland, entering league against the Visconti of Milan in 1426, thereby acquiring Bergamo, Brescia, and Cremona. In 1441 Velaggio, Peschiera, and Lonato were added to the Venetian territories. The misdeeds of his son, Giacopo, brought about the doge's deposition, Oct. 24, 1457, and he died Nov. 1, 1457. Byron's tragedy, *The Two Foscari*, is founded on the lives of Francesco and his son.

**Foscolo, Ugo** (1778-1827). Italian poet, romancer, and patriot. Born at Zante, Jan. 26, 1778, of Venetian and Greek descent, and christened Niccolò, he changed his first name to Ugo. His story, *Lettere di Jacopo Ortis*, 1798, reflects the melancholy of the romantic period, and his best known poem, *I Sepolcri*, 1807, was inspired by the reverence due to the tomb and the immortality of the memories of the great. Foscolo served for a time in the French army, but, disillusioned as to Napoleon's intentions, sought refuge in England when the Austrians took Milan. He died at Turnham Green, Oct. 10, 1827. Buried at Chiswick, his remains were removed to Florence in 1871.



Ugo Foscolo,  
Italian poet

**Fossa** or **FOUSSA** (*Cryptoprocta ferax*). A carnivorous mammal, found only in Madagascar, and placed by most zoologists between the cat and the civet. It is about 5 ft. long, including the tail, which is nearly as long as the body. The fur is pale brown in colour, and the claws retractile like those of a cat.

**Fossano.** City of Italy, in the prov. of Cuneo. It stands on a hill, overlooking the river Stura, 40 m. by rly. S. of Turin, and possesses a 14th century castle. Paper, silk, hemp, and leather are manufactured. The French and Austrians fought here in 1796 and 1799. Pop. 18,731.

**Fosse** (Lat. *fossa*, ditch). Excavation outside the ramparts or outer walls of a fort. Its purpose was to hinder the advance of an

enemy, and make it impossible for him to find ground upon which to erect scaling ladders. Frequently filled with water, its effectiveness was also occasionally increased by its being planted with pointed stakes and palisades. Barbed-wire entanglements may also be placed in it. See *Castle*; *Fortification*.

**Fosse Way.** Early English name for an ancient British highway from Axminster to Lincoln. Incorporated in the Romano-British road system, no part of its 182 m. deviates more than 6 m. from a straight line between these places. It runs through Bath, Cirencester, High Cross, and Leicester. Mentioned in an Anglo-Saxon charter, 744, it ranked as one of Edward the Confessor's four royal roads. See *Britain*.

**Fossils** (Lat. *fossilis*, dug up). Term applied to traces of plants or animals found in the earth's crust.

Early Greek philosophers recognized that the sea had at times encroached upon the land, and the discovery of marine shells among the mountains seemed on this ground natural enough. In the 16th and 17th centuries a controversy arose as to whether such objects were due to the entombment of animals in muds, which afterwards consolidated round them as firm rocks, or whether they were mere imitations of organic structures naturally produced.

Field observation, notably in Italy, showed that marine beds had been raised above the sea, that large areas had been at one time submerged, and that "organized fossils" could in consequence be utilised in reading the past history of the earth. For a time there was a tendency to refer all the remains of marine animals entombed in rocks to the Noachian deluge, or to a succession of such deluges sweeping round the globe; but the great variety of these remains, and the orderly succession of the beds in which they occur, gradually led to the acceptance of more rational views.

According to the influences to which they have been subject, and to a large extent according to their age, fossil plants, shells, and bones become altered in constitution, losing some of their chemical constituents and perhaps gaining others by substitution. The passage from wood-fibre into coaly matter by the giving off of gases and the retention of a large part of the carbon is a familiar example. Fossils may suffer complete solution, but at the same time some other substance may be deposited from the solvent which preserves the origi-

nal form and structure. Corals or shells of molluscs may be replaced in this way by iron carbonate or by silica.

Frequently, however, the fossil is dissolved away, leaving only a mould, an external cast, in the enclosing rock. Shells or sea-urchins, with their central cavities, which were originally occupied by the organism, become filled with mud or some deposited mineral, and are represented after solution by internal casts, on which any perforations or patterns, or the impressions of muscular attachments, can be identified in reversed relief. The original colour is rarely preserved in a fossil state, and the sheen and iridescence of many specimens is due to the deposit of some chemical substance as a thin film, sometimes on the surface of a mere internal cast.

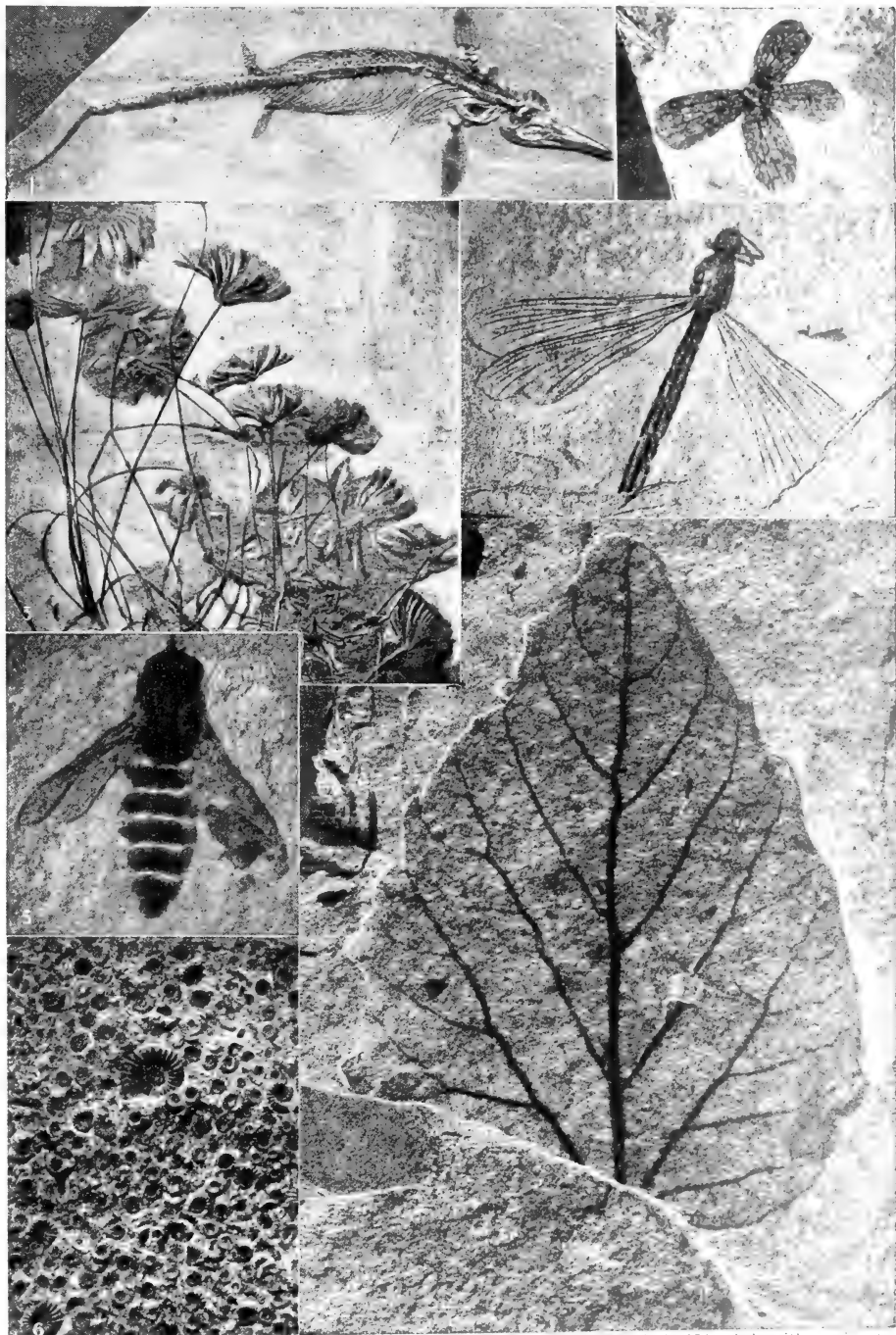
The accumulation of calcium phosphate in and around the fossils in certain beds has led to their being utilised as chemical manures.

It was not until the close of the 18th century that it was realized that strata could be "identified by organized fossils." This phrase is due to the English land surveyor, William Smith, the great pioneer of stratigraphical geology, who showed conclusively that successive deposits contained successive types of animal remains. Hence, when a sequence has been established by observation, it is possible to determine from the fossil contents the relative age of a deposit. Fossils thus become the great clue to prehistoric times.

#### A New Meaning

At first it was taken for granted that the various associations of life-forms represented independent creations, one group of plants and animals being swept away and another substituted. The nobler view that is provided by the theories of organic evolution has given a new meaning to fossils and a new zest to palaeontology, the study concerned with their description. Indeed, the discovery of numerous links between one type and another; of animals like the early reptiles, which unite in themselves the characters of groups now far apart; and of a general specialisation of life-forms, sometimes by simplification, towards those now prevalent on the earth has raised the study of past forms of life, as revealed in fossils, into one of the highest branches of natural philosophy. See *Geology*; Consult also *An Introduction to Palaeontology*, A. Morley Davies, 1920; *Invertebrate Palaeontology*, H. L. Hawkins, 1920.

Grenville A. J. Cole



1. Skeleton of *Ichthyosaurus intermedius*, about 9 ft. long, Lower Lias, Somerset. 2. Fossil flower of *Porana tenuis*. This flower now only grows in Asia, and its appearance in the Florissant shales, Colorado, suggests continuity of land between the continents when the

shales were formed. 3. Slab of Lias shale, with remains of crinoid, *Pentacrinus hiermeri*, Württemberg. 4. Dragon fly, Florissant. 5. Horse fly, Florissant. 6. Marston stone, from Lower Lias near Yeovil, full of ammonites. 7. Leaf of mulberry, *Morus symmetrica*, Florissant

# FOSSIL: RECORDS OF NATURE BEFORE THE APPEARANCE OF MAN

2, 4, 5, and 7, *American Museum Journal*. 3 and 6, *British Museum*

**Fossombrone.** City of Italy, in the prov. of Pesaro e Urbino. The ancient Forum Sempronii, it stands on the Metauro, here spanned by a handsome modern bridge, 10 m. E.N.E. of Urbino. It has a castle and a cathedral rebuilt in the 18th century. There are silk factories and mineral springs. Ruins of the Roman city, destroyed by the Goths and Lombards, lie about 2 m. N.E. of the town, which had a bishop in the 6th century. Pop. 9,701.

**Foster.** Famous family of English cricketers. The sons of the Rev. Henry Foster, a master at Malvern College until his retirement in 1915, they were there educated. Their names are as follow: H. K. Foster, Capt. W. L. Foster, D.S.O., who won this honour in Somaliland, R. E. Foster, B. S. Foster, G. N. Foster, and M. J. A. Foster. All played for Malvern and Worcestershire, which was sometimes called on this account Fostershire. H. K., R. E., and G. N. Foster gained their blues at Oxford. R. E. Foster, who died in 1914, was the finest batsman and fielder of the brothers. At Lord's in 1900 he scored a century in each innings for the gentlemen against the players, and at Sydney in Dec., 1903, he scored 287 against Australia, a record for a test match. He was a great fielder at slip.

**Foster, SIR GEORGE EULAS** (b. 1847). Canadian statesman. Born in New Brunswick, Sept. 3, 1847, he was educated at the university there, and afterwards at Edinburgh and Heidelberg. From 1872-79 he was professor of classics at New Brunswick. In 1882 he entered parliament for Kings, New Brunswick. In 1885 he was minister of marine and fisheries under Sir John Macdonald. He became minister of finance in 1888, and remained in the cabinet until 1896.

In 1911 he took office as minister of trade and commerce under Sir Robert Borden, and acted as premier during his chief's absence from Canada on imperial business. He was made a G.C.M.G. in 1918, was one of Canada's representa-

tives at the Peace Conference in Paris, 1919, and was head of the Canadian delegation to the Assembly of the League of Nations at Geneva in 1920.

**Foster, JOHN** (1770-1843). British essayist. Born near Halifax, Yorkshire, Sept. 17, 1770, the son of a yeoman weaver, he spent some of his early years at the loom. At the age of 17 he joined the Baptists, and, after study at Briery Hall and the Baptist College at Bristol, he was inducted into his first charge at Newcastle-on-Tyne, 1792. After filling pastorates in Dublin, Cork, Chichester, Downend, and Frome, he resigned in 1806 owing to throat trouble.

In 1805 appeared his *Essays*, by which he is chiefly remembered, and in the same year he became one of the principal contributors to *The Eclectic Review*. He died at Stapleton, near Bristol, Oct. 15, 1843. A friend of Robert Hall, and a man of remarkable force of mind, Foster achieved success neither as preacher nor lecturer, but as a writer he was one of the masters of modern English prose. His *Essays*, particularly that *On Decision of Character*, are distinguished by imagination, depth, eloquence, and sincerity. See *Life and Correspondence*, J. E. Ryland, 1852; *Historical and Biographical Essays*, 1859.

**Foster, MYLES BIRKET** (1825-99). British artist. Born at N. Shields, Feb. 4, 1825, of Quaker parentage, he studied under Ebenezer Landells, wood engraver, for whom he drew many illustrations on the blocks. Starting on his own account in 1846, he illustrated

in black and white many poetical publications, and in 1859 turned to water-colour, painting especially idyllic landscapes in Surrey and other home counties. He became associate of the Royal Water Colour Society in 1860 and member in 1861. He died at Weybridge, March 27, 1899.

**Fosterage.** Term used for the nursing and bringing-up of children by others than their parents. The custom prevailed in ancient Ireland, where the ties of fosterage were

almost as close as those of blood relationship. Fosterage was undertaken either for payment or from affection, and lasted until the age of 13 for girls and 17 for boys. Apparently the mother paid for the fosterage of the boys and the father for that of the girls. A child was obliged to provide for the foster-parent in old age. See *Family; Kinship*.

**Fotheringhay.** Parish and village of Northamptonshire, England. It stands on the Nene, 4 m. N.E. of Oundle. Few traces remain of its 11th century castle, famous as the scene of the imprisonment, trial, and execution of Mary Queen of Scots in 1587, and as the birthplace of Richard III in 1452. Pop. 200.

**Foucault, LÉON** (1819-68). French physicist. Born Sept. 18, 1819, and educated privately, he became physicist to the Paris Observatory, where he constructed various instruments, of which the gyroscope and the polariser which bear his name were the most notable. He determined the relative velocities of light in air, in water, and in a vacuum; but is best remembered by "Foucault's pendulum." From the roof of the Panthéon in Paris he hung a pendulum 200 ft. long, free to oscillate in any direction. The pendulum never retraced its path, but always deviated to the right, showing that the floor was moving and the earth rotating. Foucault died at Paris, Feb. 11, 1868.

**Foucault Currents.** Currents induced in solid iron cores by alternating current passing through coils wound thereon, and by rotation in a magnetic field. See *Electricity; Magnetism*.

**Fouché, JOSEPH** (1759-1820). French politician. Born near Nantes, May 21, 1759, he was

educated by the Oratorians in Paris. Ordained priest, he became a teacher, and rose to be principal of Nantes College in 1790. Throwing in his lot with the Revolution, he sat in the National Convention (1792), became a Jacobin, and vehemently advocated the execution of Louis XVI. Having renounced his orders, he was the moving spirit in the mummeries of the worship of reason and the spoliation of the churches.

Instrumental in the fall of Robespierre, Fouché occupied various positions in the succeeding government, becoming minister of



John Foster,  
British essayist



R. E. Foster,  
English cricketer



Sir George E. Foster,  
Canadian statesman

Russell



M. Birket Foster,  
British artist



Joseph Fouché,  
French politician



police in 1799. Under Napoleon he retained this position, was raised to the senate, and, under the empire, was also minister of the interior. He was made duke of Otranto in 1808 and governor of Illyria in 1813. After Leipzig, seeing that Napoleon's power was on the wane, he prepared the way for deserting to the Bourbons, under whom, after 1815, he again became minister of police. He was, however, exiled as a regicide in 1816, and died in Trieste, Dec. 25, 1820. It was Fouché who said of the murder of the duc d'Enghien, "It was worse than a crime; it was a blunder."

**Fougasse** (Fr.). Military mine originally placed under the glacis or ditch of a fortress. It is sometimes used to defend a defile or other approach by throwing a shower of stones upon the enemy. An excavation is made, the axis of which is inclined at an angle of about 40° to the horizon; it is about 4 ft. deep, in the form of a frustum of a cone, 5½ ft. at the surface. In a recess at the bottom is placed a square box of gunpowder, inclined to the horizon at 40°, and on the box a wooden shield about 6 ins. thick. The excavation is filled up with stones, the excavated earth being placed in a mound in a line with the powder box to increase the resistance upwards, and so ensure the effect of the explosion upon the stones at the required angle; the fuse is led up from the box over the mound. With a charge of 30 lb. of gunpowder the explosion will hurl three-quarters of a ton of stones a distance of 200 yds., spreading them over a surface 90 yds. wide.

**Fougères.** Town of Brittany, France. It stands on the Nançon, in the dept. of Ille et Vilaine, 30 m. from Rennes and 23 m. from S. Malo. The chief buildings are the churches of S. Sulpice and S. Leonard, both of the 15th century, while there are remains of the castle and other fortifications built to protect the town in the Middle Ages. The castle, standing on a rock, was partially restored in the 20th century. Its eleven battlemented towers give an idea of its original size and strength. The hôtel de ville dates from the 15th century, and there are some old houses. The town is now a market for agricultural produce and a centre of tanning and other industries connected with the manufacture of boots and shoes. Granite is found in the vicinity. Fougères was long one of the strong places of Brittany, and was more than once taken by the English. Pop. 23,500.

**Foula.** One of the Shetland Islands, Scotland. It lies 16 m. to the S.W. of the mainland, and is frequented by numerous sea-fowl. It is a thriving fishing centre. Its length is 3 m., breadth 1½ m., and highest point 1,370 ft. Pop. 184.

**Foulard** (Fr.). Soft, thin, flexible fabric made of silk or silk and cotton, usually printed in colours on a light or dark ground. The name was formerly applied to a gauze ribbon material manufactured in France.

**Fould, ACHILLE** (1800-67). French statesman. Born in Paris of a wealthy Jewish family, Nov. 17, 1800, he succeeded his father in the direction of his bank, and was elected to the chamber as deputy for Hautes Pyrénées, 1842. Throughout Napoleon III's career as president and emperor, his financial abilities made him a prominent administrator. He was finance minister almost continuously between 1849-52, minister of state and of the imperial household, 1852-60, and minister of finance, Nov. 14, 1861, to Jan. 19, 1867. He extricated the national finances from a difficult position by his reduction of the 4½ p.c. stock to 3 p.c., by additional taxes and stamp duties, 1862, and by floating a successful loan, 1863. He resigned office on Napoleon's concessions to liberal reform schemes, being succeeded by Rouher, and died Oct. 5, 1867.

**Foulis, ROBERT** (1707-76). Founder of the Foulis Press at Glasgow. Born at Glasgow, April 20, 1707, while a barber's apprentice he attended the university lectures of Francis Hutcheson, on whose advice he started business as a printer and bookseller in 1741. Two years later he was appointed printer to Glasgow University, and in 1744 took his brother Andrew (1712-76) into partnership. After the death of the two brothers the business was continued by Robert's son, Andrew (d. 1829).

The Foulis Press issued more than 550 vols., reprints of Greek, Latin, and British classics, remarkable for beauty of type, format,

and textual accuracy. They included the "immaculate" Horace, 1744; the fine Homer, in four folio vols., 1756-58; a folio edition of Paradise Lost, and the poems of Gray and Pope. A collection of Foulis books is in the Mitchell Library, Glasgow. *Pron.* Fowls.

**Foundation** (Lat. *fundare*, to lay the bottom of, found). Literally, the base of a building, or that upon which a structure rests. It is freely used, however, for a society, such as a college or school, hospital or monastery, which is endowed, and so founded or set up on a permanent basis. The money given for this purpose and the conditions for which the society exists are the foundation, the work of the founder.

Those on the foundation of a college at Oxford or Cambridge, or of a school such as Winchester and Eton, are those scholars and others who receive money from the college funds, under the conditions laid down by the statutes. Permanent charities, such as an almshouse or a hospital, are also known as foundations, as are cathedrals. The chapters of the English cathedrals are divided into old foundations and new foundations. The former are those which were unchanged at the Reformation; the latter those which being then composed of monks, were provided with new chapters. *See* Cathedral.

**Foundation.** In building operations solid rock of a tough character is an ideal foundation. Gravel also is excellent, and the same may be said of dry sand, provided there be a fair depth of the material. Wet sand, clay, and alluvial deposits give a less trustworthy, uncertain support. When soft ground has to be dealt with, several alternatives are open to the engineer. He may prefer to distribute the weight over a large area by means of a wide platform of concrete or ferro-concrete; or to make the foundations comparatively narrow, but deep, and utilise the friction between them and the ground. If water be present, it may be necessary to drive piles down close together till the surface friction offers a sufficiently high resistance; or until they strike rock or other firm material. Wooden piles will stand loading up to 100 tons per square foot of head area, and make an excellent substitute for rock, when they actually rest upon it or gravel. The heads of the piles are connected by crossbeams, which in turn support a platform of concrete or wood which constitutes the bearing surface.

Where the foundation site is



Achille Fould,  
French statesman  
After Philippeaux



Robert Foulis,  
Scottish publisher  
From a medallion by  
J. Tassie

large and covered by water, and excavation will not be deep, the area is enclosed by an artificial water-tight wall, or cofferdam, and dried by pumping, after which work proceeds as on dry land. In soft ground a cofferdam is usually formed by driving down two parallel rings of sheet piling, a few feet apart, and filling in the space between them with water-tight clay puddle. On rock, steel plates, cut to fit the contour of the surface, are used instead of piles, and the joint is made tight by concrete and clay packed outside. A cofferdam is, as a rule, removed when the work inside has been completed.

#### Use of Caissons

Deep foundations in water-logged and water-covered ground are put in by means of cylindrical or box caissons (*q.v.*), which are sunk by excavating the ground inside and remain in their final position as part of the structure.

If a water-tight joint between caisson and ground be obtained, the interior is pumped dry and hand labour is used to excavate the space inside the caisson, the sides of which are raised as sinking proceeds. When a sufficient depth has been reached, the caisson is filled with masonry or concrete to above high-water level. Should water find its way in, grabs and dredges do the excavating and concrete is lowered through the water to displace it. Open caisson foundations have been carried to depths exceeding 150 feet.

For deep bridge foundations the closed or pneumatic caisson is generally preferred to the open. Such a caisson has a horizontal air-tight floor seven or eight feet above the cutting edge; and the working space below the floor is filled with air at a pressure sufficient to exclude the water outside. Air-locks and shafts are provided for the passage of men and material.

#### Remarkable Feat at St. Louis

In 1854 the younger Brunel used a pneumatic cylinder for the central pier of the Saltash Bridge, which is founded on rock 88 feet below high water. Twenty years later Eads sank two piers of the St. Louis Bridge to 117 and 119 feet beneath the surface of the Mississippi on box caissons, building up the masonry as the caissons sank. This was a remarkable feat, since the air pressure required to keep the water out rose to nearly 50 lb. per square inch, and the working conditions were extremely exhausting. More recently, the foundations of the Forth Bridge and of the three great suspension bridges of New York were constructed in this way.

When a pneumatic caisson

reaches its final level the chamber under the floor is filled with concrete, the men backing out through the shaft left in the masonry above, and the shaft itself is then closed.

Cast-iron cylinders, sunk either as open or pneumatic caissons, are commonly used to support the piers of railway bridges. Charing Cross Bridge is an example in point. The cylinders are 14 feet in diameter, and penetrate the bed of the river 20–50 feet. Some of the steel “skyscrapers” in New York are built upon cylinders sunk to rock. The Singer building rests on 34 caissons carried down 200 feet. In such cases the piers may be regarded as gigantic piles. See Building; Caisson; Shaft-sinking; consult also Practical Treatise on Foundations, W. M. Patton, 1900.

**Foundation Sacrifices.** Ritual immolation at the foundation of a building or settlement. Human skeletons are found beneath corner-stones in early Palestine, as at Gezer and Megiddo. When Mandalay was built, 1860, 52 human victims were buried alive. Legends of living burial are recorded of S. Columba's Cathedral, Iona; S. Patrick's monastery, Clonmacnoise. Animal bones were unearthed beneath old S. Paul's and Blackfriars Bridge, London. The Scandinavian kirk-grim was the spirit of the foundation victim. Animal slaughter as a foundation rite survives from W. Africa through Coptic Egypt and Moslem Syria to Borneo. The interment of statues in ancient Rome and effigies in medieval Europe points to an anterior custom of actual blood-shedding.

**Founder.** Disease affecting horses, cattle, sheep, and pigs. Known in veterinary science as laminitis, it is a painful inflammation of the laminae, or tissues connecting the hoof with the bones of the foot. It is caused by bad management and careless feeding, horses that have much corn and little exercise being very apt to develop it suddenly. Certain foods, such as Indian corn, beans, peas, and barley, undoubtedly predispose to this form of fever. Treatment consists in strong purgative medicines and blood-letting, and frequent warm bran poultices. The animal may be slung, in order to take its weight off its feet, and if the pain is very severe cocaine may be administered.

**Founders' Company, THE.** London city livery company. It was sometimes called Copper-smiths. Established as a fraternity in the 14th century, and incorporated in 1614, it had power of search over all brass weights and brass and copper wares in the city. The hall



Founders' Company arms

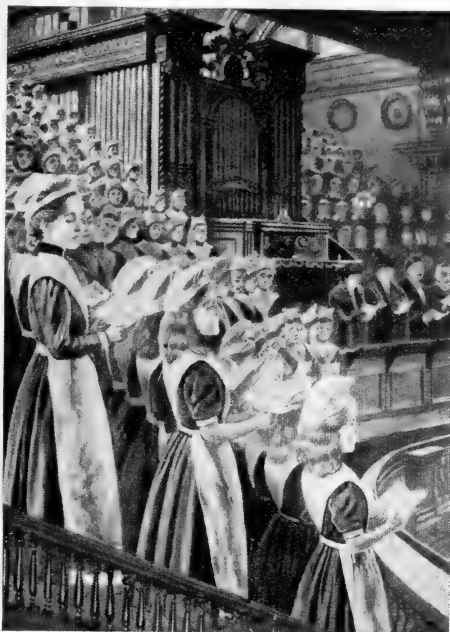
in Lothbury, E.C., built 1531, burnt 1666, and for a time let as a chapel, is now occupied by the G.P.O. The present hall, 13, St. Swithin's Lane, E.C., dates from

1877. See Annals of the Company of Founders, W. M. Williams, 1867.

**Founder's Share.** Class of share granted to the originators of a joint stock company, or to others who have rendered services to it. They are usually few in number, and for very small amounts, 1s. perhaps; but sometimes they become very valuable because they participate in the profits after a certain fixed amount has been reached. The fact that their total amount is small enables a successful business to pay an enormous percentage on such shares. This class of share is rarely issued now, and in some cases those issued earlier have been bought out and cancelled. See Company Law.

**Foundling Hospital.** Institution originally founded to prevent the murder or exposure of newly born children. Such institutions appear to have been coincident with the development of civilized society, and they undertake the education and training of children until the latter reach maturity. The first step towards avoiding the crime of child murder was the exposure or abandonment of an infant in a public place in the hope that it would be cared for by someone other than the parents. The earliest recorded case of exposure seems to be that of Moses (Exodus 2). Foundlings thus exposed were assigned as property to those who took them under their protection, and provision was made in ancient Greece and Rome for the upbringing of unadopted infants at the expense of the State, an example followed by the French in 1790.

At Trèves Cathedral, in the 6th century, foundlings were received and arrangements made for their care under the supervision of the archbishop. The first foundling hospital of which there is authentic record was that at Milan towards the end of the 8th century. The Order of the Holy Ghost, founded at Montpellier in the 12th century, made the care of foundlings a special duty. The Spedale degli Innocenti, or Foundling Hospital, at Florence, dates from 1419–51. The Ospedale di S. Spirito, in Rome, founded by Innocent III, included a foundling institution. In 1536



Foundling Hospital, London. Children singing carols in the chapel at Christmas

Marguerite de Valois instituted a foundling hospital which was incorporated with the great Foundling Hospital in Paris, started in 1670. Foundling hospitals now exist in all the great capitals of the world, though the word foundling does not correctly describe them all.

One of the most interesting of these institutions is that in London. Its founder, Thomas Coram (c. 1668-1751), a captain in the merchant service, and a man of comparatively humble means, advocated his project for nearly 20 years before, in 1739, it was realized. A house was taken in Hatton Garden, and opened March 25, 1741, for the admission of 20 infants. The existing building in Guilford Street, Bloomsbury, dates from 1754, when it had 600 inmates, supported at an expenditure of five times the income. Parliament voted a grant of £10,000, but stipulated for indiscriminate admission, which had to be abandoned. Since 1760 admission has been limited to illegitimate children who have been deserted by the father, but whose mothers can prove previous good character. In 1920 there were about 700 inmates. Hogarth, one of the earliest governors, began an art exhibition in its rooms which led to the foundation of the annual exhibitions of the Royal Academy. Handel was another tireless benefactor, and since his day the hospi-

tal has had a high musical reputation. Its removal to the country and rebuilding was announced in Nov 1924.

The boarding out of infants in suitable homes before they become regular inmates of foundling hospitals has proved beneficial. The mortality in these institutions has, however, taxed the best energies of philanthropy and medicine, but in London and Paris in recent years much improvement has been effected. See Baby Farming; Child Welfare; Infanticide; Orphanage; consult also *Histoire des Enfants abandonnés*, Senichon, 1880.

**Foundry** (Lat. *fundere*, to pour). Word used for (1) the art of founding or casting in metals, and (2) an establishment wherein metal is cast. See Casting; Iron; Steel.

**Fount.** In printing, a term for a supply of type of one size and face, with a distinctive nick. The quantity is ordered according to the number of compositors employed and the class of work for which it is required. For newspapers, an extra quantity of capitals and figures is necessary. With this proviso, a fount will contain a standard number of all the letters of the alphabet, graded in bulk according to the occurrence of the letters in the language in which the type is cast. In the U.S.A. the word is spelt font. See Printing; Typefoundry.

**Fountain** (late Lat. *fontana*). Term applied to any construction for the supply of water, from a simple spring to an elaborate artificial basin with ornamental jets. The need of fountains was experienced in Oriental countries at a very early date. Traces of their employment have been found among the relics of the Chaldaean civilization; Pausanias mentions Hellenistic examples; and in ancient Rome they were fully developed as a means of distributing the water brought to the city by the aqueducts. Pliny the Elder notes the construction or repairing of more than 1,200 fountains in Rome alone.

The treatment of fountains was at first purely utilitarian. During the Renaissance, however, the ornate fountain was rapidly developed. The fountains of Berne, each dignified with a name of its own—The Bear, The Ogre, Justice—and the Fountain of the Innocents in Paris (dated 1550) are imposing architectural structures. The common type of Renaissance fountain was a shallow basin, with a pillar of marble often surmounted by a statue of stone or bronze in the centre, from which projected jets that supplied the running water.

The more primitive type was represented by the drinking fountains at street corners. In France, the zenith of fountain-construction was reached under Louis XIV; one may cite the elaborate fountains at Versailles, with their thousands of jets. When the practice of installing a water supply in individual houses was introduced towards the end of the 18th century, utilitarian fountains became rare. But bodies like the Metropolitan Drinking Fountain Association, formed in London in 1859, proved that the demand for this type still exists. Notable ornamental fountains of modern times are the Fontana di Trevi at Rome, and the fountains in the Place de la Concorde, Paris. See Illus.

**Fountain Pen.** Pen in which ink from a reservoir in the holder is fed automatically to the nib. One or more feeders, fitted above or below the nib, regulate the supply of ink, which flows by capillarity. The nibs are made of gold to prevent corrosion, and have iridium-osmium points.

Self-filling fountain pens are supplied with ink other than by pouring. One type has in the holder a long flexible reservoir from which the air is expelled, before filling, by a plate, actuated by a small outside lever pressing the reservoir tightly against the inner wall of the holder. When the air has been expelled, the nib is immersed in ink; the lever is turned back into its original position flush with the holder and the ink rises into the reservoir. Another type is fitted with a small plunger, the pumping action of which charges the reservoir. In a third type, the filling is effected by the pumping action of a rubber dome fitted to a bottle containing ink, the nib-end of the pen being inserted in a neck on the dome.

**Fountains Abbey.** Ruined abbey in Yorkshire, England. It stands near the little river Skell, 3 m. S.W. of Ripon; it is in the grounds of the mansion of Studley Royal, while near it is a mansion dating from Stuart times, Fountains Hall. The ruins are

extensive, including those of the church with its tower, the former being 380 ft. long, the chapter house, the magnificent cloisters, and other parts. They are perhaps the most complete in England and, with the possible exception of Tintern, the most beautifully situated. The abbey, a Cistercian house, was a long time in building. Begun about 1140, it was only completed 200 years later. The monks came from S. Mary's Abbey, York. The house was dissolved by Henry VIII and the ruins and lands were sold. See Abbey; Cloister, illus.

**Fouqué, FRIEDRICH HEINRICH KARL, BARON DE LA MOTTE** (1777-1843). German author. Born at

Brandenburg. Feb. 12, 1777, of Huguenot origin, he took part as a cavalry officer in the Prussian campaigns of 1794 and 1813, but literature occupied most of his time. For



Baron de la Motte Fouqué, German author

a while he was the most popular of German story-tellers, but his dependence upon the supernatural militated against a permanent popularity. He is chiefly remembered for his tale of Undine, 1811, while Aslauga's Knight, and Sintram and his Companions, which have been translated into English, still find readers. He died in Berlin, Jan. 28, 1843.

**Fouquet or FOUQUET, NICOLAS**, Marquis de Belle Isle, Viscount de Melun et de Vaux (1615-80). French

statesman. Born of a noble family, he held various posts in the parliament of Paris while still a youth, becoming procurator-general in 1650. In 1653



Nicolas Fouquet, French statesman

Mazarin made him superintendent of finances, and Fouquet used his position to make himself one of the wealthiest men in France. He worked to succeed Mazarin, 1661, as the king's chief minister, but Louis XIV, on Colbert's advice, passed him over.

Fouquet built himself a luxurious palace at Vaux, entertaining lavishly and patronising the arts and letters. But Louis, exasperated by his long mismanagement of the finances and his overweening ambition, had him arrested at Nantes, Sept., 1661. His

trial, 1661-64, ended in his imprisonment for life at Pignerol, Piedmont, where he died, March 23, 1680. The theory that Fouquet was the Man in the Iron Mask (*q.v.*) has been proved untenable.

**Fouquier-Tinville, ANTOINE QUENTIN** (1747-95). French Revolutionist. Born at Hérouel, Aisne,



A. Q. Fouquier-Tinville, French Revolutionist  
From a sketch

and trained for the law, he came to Paris and entered the secret police in 1783. A violent democrat, he joined the extremist party in the Revolution, and was appointed by Robespierre public prosecutor of the Revolutionary Tribunal, 1793. Utterly inhuman, he sent men and women of all ages and parties to the guillotine, Bailly, Danton, Robespierre, and St. Just amongst them, but in the reaction from the Reign of Terror he himself was convicted and guillotined on May 7, 1795.

**Fourberies de Scapin, LES** (The Tricks of Scapin). Three-act comedy by Molière. Derived partly from classical and partly from Italian sources, its scene is laid in Naples. Scapin, a servant, a character acted by the author, plays a series of tricks on two fathers, so that their sons may marry the two girls with whom they have fallen in love. The girls prove to be the brides whom the duped fathers had originally had in view.

The play, which has been described by Brander Matthews as a Punch-and-Judy piece for grown-ups, was first produced at the Palais-Royal, Paris, May 24, 1671. Otway wrote an English version, The Cheats of Scapin, 1677.

**Fourcroy, ANTOINE FRANÇOIS** (1755-1809). French chemist. Born in Paris, June 15, 1755, he was appointed in 1784 to the chair of chemistry at the Jardin du Roi. At the Revolution he became a member of the committee of public safety, and to his indifference is attributed the execution of Lavoisier. Among his discoveries are adipocere, cholesterol, the double salts of magnesium and ammonium, and pure baryta. He died Dec. 16, 1809.

**Four Hundred, TYRANNY OF**. Oligarchy of nobles established in Athens for four months in 411 B.C. The prime author of the change of government was the exiled Alcibiades (*q.v.*), who knew he could not return to Athens so long as a democratic government was in power; the chief conspirator was

Pisander. A reign of terror ensued and the Four Hundred made peace overtures to Sparta. The main Athenian army at Samos was furious, and the people at home, disgusted with the oppressive measures and pro-Spartan sympathies of the Four Hundred, took matters into their own hands, and with a surprisingly small amount of bloodshed restored the democracy. See Greece: History.

**Fourier, FRANÇOIS CHARLES MARIE** (1772-1837). French Socialist. Born at Besançon, April 7,



F. C. Fourier, French Socialist

1772, the son of a well-to-do tradesman, having lost his inheritance in business, he served two years in the Revolutionary army, and then became a commercial traveller. He set himself to evolve a new social system in a series of works, the chief of which are Theory of the Four Movements, 1808, and The New Industrial World, 1829.

Fourier's ideas attracted little attention during his lifetime, but were much discussed in the U.S.A. from 1840-50. Several communities, notably those of Brook Farm (*q.v.*) and Red Bank, were established to put them into practice, but met with little success.

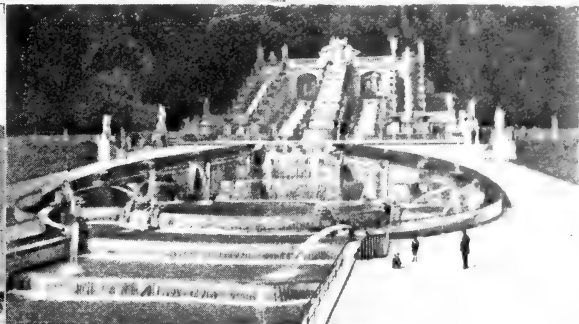
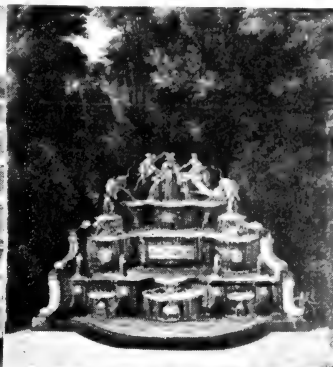
Fourier's theory was that, man being essentially a gregarious animal, the population should be redistributed in a number of new social units, to which he gave the name of *phalanges*. Each *phalange* was to consist of 1,500 to 1,800 people, housed in a common building or *phalanstère*, with a square league of land attached, was to be industrially complete in itself and self-governing. Each worker was to receive a minimum wage, and the surplus was to be distributed thus: five-twelfths to labour, three-twelfths to talent, four-twelfths to capital. Fourier died at Paris, Oct. 8, 1837.

**Fourier, JEAN BAPTISTE JOSEPH** (1768-1830). French mathematician and physicist. Born at Auxerre, March 21,



J. Baptiste Fourier, French mathematician

1768, he took an active part in the Revolution in that district. Later he accompanied Napoleon on his Egyptian expedition, and was made governor of



1. Neptune fountain at Bologna, by Giovanni da Bologna, 1563-67. 2. Buffet cascade, Grand Trianon Gardens, Versailles, by Hardouin-Mansart, c. 1688. From an old painting. 3. Fountain of Falling Waters, Mexico City, 1755. 4. Fountain in Piazza Navona, Rome, by Bernini,

c. 1650. 5. Grande Cascade, St. Cloud, c. 1690. 6. Medina fountain, Naples, 17th cent. 7. Marble fountain in the gardens of the Paseo Colon, Buenos Aires. 8. Hercules fountain, Villa Reale di Castello, Florence, by N. Tribolo (1485-1550). 9. Basin of Apollo, Versailles, by Lebrun, c. 1680

# FOUNTAIN: ARTISTIC EXAMPLES FROM GREAT CITIES OF EUROPE AND AMERICA



Lower Egypt. On his return to France he carried out experiments on the propagation of heat. His *Théorie analytique de la Chaleur*, 1822, was based on Newton's Law of Cooling, and contains an account of the mathematical series by which he is chiefly remembered. He died at Paris, May 16, 1830.

**Fourier Series.** A trigonometrical series, involving sines and cosines of simple multiples of a variable which is restricted in possible value between definite limits. Such a series, named after J. B. J. Fourier, is of value in the solution of many problems in physics.

**Four-in-Hand Club.** English club founded in 1856 to preserve the sport of driving four-horsed coaches. It succeeded the Bensington Driving Club (1807-52), and is as exclusive. The Coaching Club, founded in 1870, received as members gentlemen for whom no vacancy offered in the older club. The annual meet of the Four-in-Hand Club at the Magazine in Hyde Park is one of the social events of the London season. *See* Driving; also Coaching, *illus.*

**Four Lakes.** Name given to a series of four lakes in Wisconsin, U.S.A. They are the Mendota, Monona, Waubesa, and Kegonsa, and are situated in the S. part of the state. Occupying an area of 225 sq. m., they are drained to the Rock river, by the Yahara river, and are navigable by steamers. Madison, the state capital, stands between Monona and Mendota.

**Fourmies.** Town of France. In the dept. of Nord, it is 38½ m. S.E. of Valenciennes. An industrial town, it had before the Great War manufactures of woollen, cloth, glass, and iron goods. The glass works date from about 1600. The town is a rly. junction, and during the Great War it was in the occupation of the Germans. Pop. 13,800.

**Fournet, d'ARTIGE DU** (b. 1856). French sailor. He saw service in the East, taking part in the Tongking War, 1883, and the Chinese campaign, 1885, when he was awarded the cross of the Legion of Honour. In 1893 he commanded the *Comète* in the



D'Artige du Fournet,  
French sailor

Siam War, forcing the passage of the Menam and reaching Bangkok. Becoming rear-admiral in 1900, he commanded the French squadron in the international naval demonstration during the Balkan War.

At the outbreak of the Great

War, as vice-admiral he commanded the Flotte du Levant off Syria, and later the Dardanelles fleet. In Oct., 1915, he was appointed commander-in-chief of the French navy with supreme command over the Allied fleets in the Mediterranean, obtaining the surrender of the Greek navy in Oct., 1916. He retired in Dec., 1916.

**Fourth.** Musical interval which includes four consecutive scale names, as C, D, E, F. The interval between C and F is called a fourth, and as F is the fourth degree of the scale of C this is called a perfect fourth, and by some a major fourth. *See* Interval.

**Fourth Dimension.** Term used for hyper space next to the three-dimensional space in which we live. A line has only one dimension, length; a surface two, length and breadth; a solid three, length, breadth, and thickness. A fourth dimensional body would have the last three and one other which may be argued about from a mathematical point of view and provides a plausible answer to many of the problems of physics, as for example the explanation of gravity and the fact that there are only a finite number of kinds of matter.

The idea of a fourth dimensional space springs logically from the algebraic expression of geometrical forms. If a quadratic equation

can be made to express any geometrical figure on a plane surface, a cubic equation, the geometric relations of a solid, then an equation of higher powers might be held to represent the relations of points, lines, surfaces, and solids, or super-solids in space of more than three dimensions.

The Italian geometer Veronese wrote a work on geometry of  $n$  dimensions, and the theorem was considered by mathematicians such as Cayley, Riemann, and Clifford in the middle of the nineteenth century. *See* Mathematics; consult also Scientific Romances, 1884-88; The Fourth Dimension, 1904, both by C. H. Hinton.

**Fourth Estate.** Term sometimes applied to the press to emphasise its importance in the state, the three estates of the realm according to the constitution being

the lords spiritual, lords temporal, and commons. The term was first used by Edmund Burke. *See* Estates; Journalism.

**Fourth Party.** Name given about 1880 to a small independent and irresponsible body of Conservative politicians. They were Lord Randolph Churchill, Sir H. Drummond Wolff, Sir John E. Gorst, and at times A. J. Balfour. Throughout the Parliament of 1880-85 they frequently opposed and annoyed their leader, Sir Stafford Northcote.

**Foveaux.** Strait or channel separating Stewart Island from South Island, New Zealand. It is about 25 m. across.

**Foweira.** Village of Uganda. It stands on the Victoria Nile, 62 m. below Lake Kioga and 160 m. from Namasaghi. The Nile is navigable from Lake Kioga to Foweira, but here occur some 50 m. of rapids.

**Fowey.** Seaport, market town, and watering-place of Cornwall, England. It stands on the W. shore of the Fowey estuary, 10 m. S. by E. of Bodmin, on the G.W.R. It has a fine harbour, formerly protected by three forts now in ruins, is a favourite yachting station, and is largely occupied in the pilchard-fishing industry. An important port in the Middle Ages, it supplied nearly 50 vessels for the blockade of Calais in 1346. There is a trade in china clay. Market day, Sat. Pop. 2,276. *Pron.* Foy.



Fowey. The town and river estuary looking towards the sea

**FOWKE, SIR GEORGE HENRY** (b. 1864). British soldier. Born Sept. 10, 1864, he entered the Royal Engineers in 1884, and took part in the S. African War. A.A.G. for the R.E. at the War Office, 1910-13, he was inspector of the R.E. in 1913, which post he



Sir George H. Fowke,  
British soldier

Russell



1. Houdans. 2. Salmon Faverolles. 3. Buff Orpingtons. 4. Dark Dorkings. 5. Silver grey Dorking hen. 6. Silver Duckwing Yokohama cock. 7. Silver Camp-pines. 8. Brown Leghorns. 9. Golden Seabright faced cock and golden laced hen. 10. Partridge Cochins.

11. Bantams. 12. Spangled Old English game. 13. Modern Langshans. 14. Wyandottes, black cock and white hen. 15. Hamburgs, black cock and golden pencilled hen. 16. Anconas. 17. Wyandottes, silver laced cock and golden laced hen.

#### POULTRY: COMMON VARIETIES AND FANCY BREDS

*Specially drawn for Harnsworth's Universal Encyclopedia by J. F. Campbell*



17. Andalusians. 18. Leghorns, white cock and buff hen. 19. Polish Silver Spangled. 20. Duckwing game cock. 21. Barred Plymouth Rocks and white Rock hen. 22. Rhode Island Reds. 23. Indian game fowls. 24. Speckled Sussex. 25. Hamburgs, silver spangled cock and golden spangled hen. 26. Black Minorcas. 27. Spanish fowls. 28. Black Red Bantam game. 29. Light Brahmas. 30. Dark Brahmas. 31. Silkie. 32. Orpingtons, black cock and Jubilee hen.

### POULTRY: FAVOURITE BRITISH AND FOREIGN BIRDS

*Specially drawn for Harmsworth's Universal Encyclopedia by J. F. Campbell*

held until the outbreak of the Great War, when he was appointed engineer-in-chief of the expeditionary force, becoming adjutant-general in France in 1916. He became lieutenant-general in Jan., 1919, and was created K.C.B. in 1916 and K.C.M.G. in 1918.

**Fowl** (A.S. *fugol*, bird). Name loosely applied to the various species of the genus *Gallus* of the pheasant family of the zoological order Gallinae, to which the game birds generally belong. Most of them have handsome plumage, and are provided with strong legs, being better adapted for running than for flight. They range in size from the quail to the turkey, are mixed feeders, and are all valued for purposes of the table.

Undoubtedly all the many varieties of the domestic fowl are descended from the wild jungle fowl of India. The jungle fowl, which flourishes well in captivity, breeds freely with the domestic varieties, and the hybrids are always fertile. There is no record of the original domestication of the jungle fowl. It is very improbable that it was at first used by the ancient inhabitants of India for cock-fighting (*q.v.*). It is far more likely that the bird was caught in greater numbers than were required for food at the moment, and that it was then found possible to keep it for a time in captivity, where it bred and thus suggested a means of multiplying and maintaining a supply of food always at hand.

#### Early Domestication

The bird is entirely absent from the remains of birds and animals found in the kitchen middens of the neolithic period, and it does not appear to have been known to the Greeks of the Homeric age. But it is mentioned in a Chinese encyclopedia compiled about 1400 B.C., though it is not clear if the wild or domesticated bird is meant. There are, however, records in the Code of Manu of cock-fighting in India about 1000 B.C., and this makes it probable—though not certain—that domestication had taken place at an earlier date. It is curious that the spread of the domesticated fowl westwards was due to the love of cock-fighting rather than to any appreciation of the value of the bird as an article of food. Aristotle in his *History of Animals* mentions the domestic fowl and gives various details of its habits and laying powers; but there is no mention of domestic fowls in the Bible until New Testament days.

When the bird first reached Great Britain is unknown, the statement that it was brought by the Phoenicians when they visited

Cornwall to obtain tin being pure speculation. It is thought that the breed now known as Dorkings was introduced by the Romans, but here again decisive evidence is lacking. But it is known that cock-fighting was popular in Britain many centuries back. The earliest definite record dates from the reign of Henry II, when William Fitz-Stephen wrote an account of the cock-fights that took place in schools on Shrove Tuesday.

#### Size and Laying

By selection in crossing, the little jungle fowl, which only weighs 3 lb., has developed into heavy breeds such as the Brahma, the Cochins, and the Houdan. The attention of breeders has been variously directed in the interests of egg production, table qualities, or merely ornamental character; it is seldom practicable to combine the three qualities in any high degree of excellence in the same bird. Obviously, a hen which lays freely cannot put on much flesh at the same time, as the food consumed goes in the production of eggs. Thus it will be noticed that the most prolific laying strains all tend in the direction of smallness. Even in the same breed it will usually be found that the small hen is the best layer, though it does not follow that she will make a good sitter. A good layer seldom reaches a weight of 7 lb.

Of the domestic laying breeds, the best one of British origin is the Hamburg, an exceptionally handsome bird, with either black or gold or silver spangled plumage. Its egg-laying proclivities are extraordinary, but the eggs are rather small. The Redcap resembles the Hamburg in plumage, but is larger. It has the advantage of producing larger eggs and does best in hilly districts. The Scottish Grey from north of the Tweed is long in the leg, with barred grey feathers, and is a capital layer. Other excellent laying strains are the Leghorn, which came from Italy; the Minorca, a fairly large Spanish bird which lays eggs of unusually large size; the Houdan, of French origin, both a table bird and a good layer; and the Polish, of doubtful nationality, which lays well but is difficult to rear.

Among British table birds, the Dorking, which is one of the oldest breeds known, stands pre-eminent, but will not do well on a damp soil. The various game fowl, which are modifications of the old fighting breed, make excellent table birds; the Sussex birds are famous everywhere under the misleading name of Surrey fowls.

In addition to these distinctively egg-laying and table birds, there

are several breeds which may be described as of the general utility order. Most of them are comparatively new varieties, and have been bred as all-round birds. They lay freely and sit well; their eggs are of good size and colour; and their table qualities are excellent. They are favourites with poultry keepers who do not specialise in breeds, and are the birds for the small man.

The Orpington breed is a comparatively late one, but is already one of the most popular. The birds are large and deep in body, and the plumage may be white, buff, or spangled. They lay well in winter, their eggs are of the popular tint, and they mature very rapidly.

The Wyandotte is one of the handsomest breeds, yielding well for the table and laying well through the winter months. The Plymouth Rock is exceptionally hardy and flourishes under adverse conditions. The Brahmas and the Cochins are both Asiatic birds, of large size and heavily feathered down the legs. Formerly popular for their great size, they do not pay to keep and are seldom bred, except for show purposes.

#### Ornamental Breeds

Of the purely ornamental breeds little need be said. They are of handsome appearance, but since bone and feather can only be produced at the cost of flesh, their small size, slowness of growth, or poor egg-laying powers make them unprofitable for market purposes, and breeders prefer to produce a few prize birds which will command fancy prices at poultry shows. These include the bantams, the Malayan fowl, the Silkies, and a few other varieties. They are nearly all of Asiatic origin. See *Poultry*; also *Ancona*; *Andalusian*; *Bantam*; *Dorking*, *illus.*

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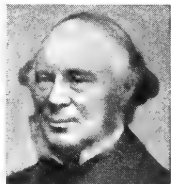
**Fowler, ELLEN THORNECROFT** (b. 1860). British novelist. Daughter of the 1st Viscount Wolverhampton, she married A. L. Felkin in 1903. Her novels, distinguished by skill in character drawing and a turn for epigram, include *Concerning Isabel Carnaby*, 1898; *A Double Thread*, 1899; *Fuel of*



Ellen Thorneycroft Fowler,  
British novelist  
Russell

Fire, 1902; Place and Power, 1903; In Subjection, 1906; and The Wisdom of Folly, 1910. They reflect mainly life in and around a midland town of England, and among Methodist surroundings.

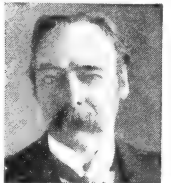
**Fowler, Sir JOHN** (1817-98). British engineer. Born July 15, 1817. He became a civil engineer and was largely employed in the many railway schemes which accompanied the boom of 1846. The Pimlico Bridge was built according to his designs in 1860.



Sir John Fowler,  
British engineer

The same year he was engaged in the construction of the Metropolitan Rly., which was opened Jan. 9, 1863. In 1869 he was consulted by Ismail Pasha with regard to engineering schemes in Egypt. In 1883, in partnership with Benjamin Baker, he designed the Forth Bridge, which was opened in 1890. For this Fowler, who had been knighted in 1881, was made a baronet. He died at Bournemouth, Nov. 20, 1898.

**Fowler-Dixon, JOHN EDWIN** (b. 1850). Athlete and writer on athletics. Born Sept. 3, 1850, he devoted himself to athletics, and in 1877 won the 50 miles and the 100 miles amateur walking records. In 1884 and 1885 he created 50 miles running records of 6 hrs. 20 mins.



J. E. Fowler-Dixon,  
British athlete

47 secs. and 6 hrs. 18 mins. 26 secs. respectively. In the former year he also made the 40 miles running record of 4 hrs. 46 mins. 54 secs., which in 1920 had not been beaten. He was principal proprietor of The Athletic News. He

helped to found the Amateur Athletic Association, and wrote *Athletes and the War*.

**Fowler's Solution.** Popular name for *liquor arsenicalis*. It is a 1 p.c. solution of arsenious acid in water with small amounts of potassium carbonate and compound tincture of lavender. It is used occasionally in medicine, chiefly in morbid conditions of the blood.

**Fox.** Animal belonging to the genus *Vulpes*, probably consisting of only one species including several local races. It differs from other dogs in the shape of its skull, and in the fact that the pupil of the eye is elliptical instead of circular. It is of slim build, with long bushy tail and rather long ears.

Foxes feed upon small mammals and birds, but also eat insects and fruit, feeding by night and spending the day in burrows, hollow trees, and clefts in rocks. They are found nearly everywhere throughout the northern hemisphere; and the common fox (*Vulpes canis*) is a well-known inhabitant of Great Britain. It is reddish-brown in colour, with white beneath; but the hue varies considerably in local races, as in the so-called greyhound fox of the Lake District. It

sometimes makes its own burrow, though it usually adapts that of the badger or rabbit. In the summer it often sleeps in a dry ditch, and has been known to make its abode in a straw rick. The young, usually four or five in number, are born about April.

The fox is valued for its fur, especially that of the black and silver varieties. It is a favourite animal for hunting, while on the other hand it often works havoc in the game preserve and the poultry yard. It would have become extinct in Britain long ago but for its preservation by the "hunts." See Fur.

**FOX OR NEENAH.** River of Wisconsin, U.S.A. Rising in the S. part of the state, it flows S.W., N., and N.E. to Lake Winnibago. Emerging from the N. end of that lake, it follows a N.W. course to Green Bay, a branch of Lake Michigan. In its upper reaches, near Portage, it is connected by a canal with Wisconsin river. It is 250 m. long, and navigable for the greater part of its course.

**FOX OR PISHTAKA.** River of the U.S.A. Rising in Wisconsin, it flows 225 m. generally S. and S.W., and passes through Illinois to unite with the Illinois river at Ottawa.

**FOX.** Channel of N. America. It lies to the N. of Hudson Bay, separating Baffin Island on the E. from Melville Peninsula and Southampton Island on the W. It communicates by Hudson Strait with the Atlantic, and by Fury and Hecla Strait with the Arctic. Luke Fox, English navigator, explored it in 1631.

**Fox Islands.** Variant name given to the Aleutian Islands (*q.v.*). It is more specifically confined to the extreme E. group, consisting of Unalaska, Unimak, Umnak, and a number of smaller islands.

**Fox Land.** Desolate region in the S.W. of Baffin Island, British N. America. It lies between Fox Channel on the N.W. and Hudson Strait on the S.E.



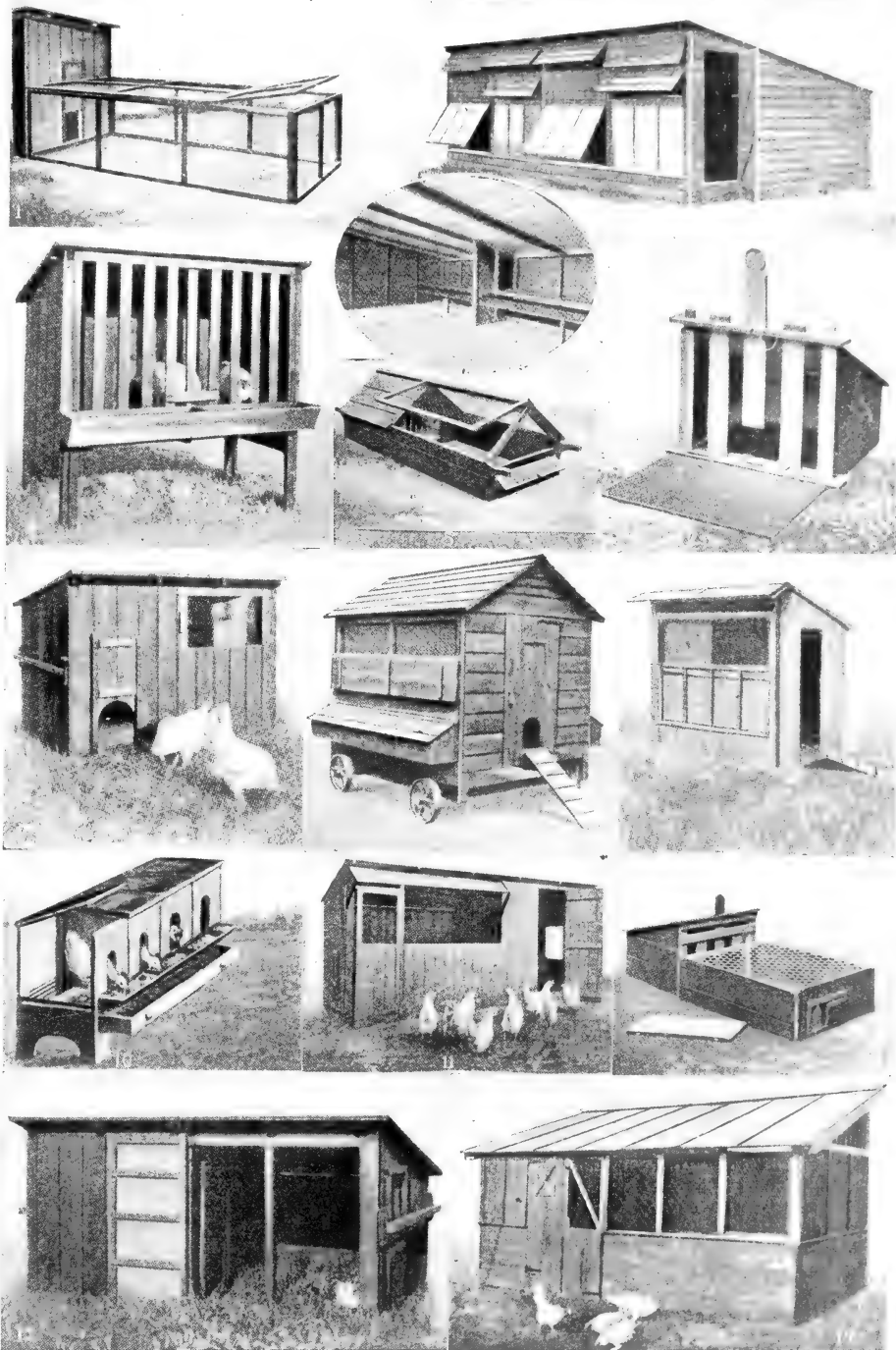
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Fox. 1. Fox emerging from its earth. 2. Common fox, *Vulpes canis*. 3. Arctic fox in winter coat





1. Simple run made with wood frame and wire netting.  
2. House 20 ft. by 15 ft. to accommodate 100 birds,  
and 3, interior. 4. Broody coop. 5 and 6. Coops for  
chicken rearing. 7. House for birds of 12 weeks.

8. Movable poultry house. 9. House for small pens.  
10. Fattening pen. 11. House suitable for a cock and  
10 hens. 12. Another form of coop. 13. Cold brooder  
14. House and run for placing against a wall

# **FOWL: COOPS AND RUNS USED IN MODERN POULTRY KEEPING**

*By courtesy of Boulton & Paul, Norwich*

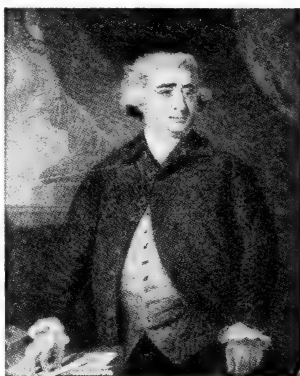
**FOX, SIR CHARLES (1810-74).** British engineer. The son of Francis Fox, M.D., he was born at Derby, March 11, 1810. Having shown a distinct gift for mechanics, he was articled to an engineer, and was soon associated with Robert Stephenson and other pioneers of the steam engine. He did engineering work on various rlys., especially the London and Birmingham, and the firm of which he became a partner began to make rly. stock, introducing therein various improvements suggested by him. Fox built the Crystal Palace in Hyde Park and afterwards at Sydenham, and was very successful with his bridges. An enormous length of rly. line, almost in every part of the world, was undertaken by his firm, as well as tunnels, stations, among them Waterloo, Paddington, etc. In 1851 he was knighted. He died June 14, 1874, leaving his two elder sons to carry on the business of Sir Charles Fox & Sons.

**FOX, SIR CHARLES DOUGLAS (1840-1921).** British engineer. Born May 14, 1840, educated at Cholmondeley School and King's College, London, he joined his father, Sir Charles Fox, in business in 1861. Associated with him in railway and other engineering work, he soon came to the front. He was president of the Institute of Civil Engineers, and in 1886 was knighted. His brother, Sir Francis Fox (b. 1844), followed a like career. He, too, joined the firm of Sir Charles Fox & Sons in 1861, and was knighted in 1912. Sir Francis was called in to advise on the restoration of Winchester Cathedral, and was one of the experts consulted about the construction of the Simplon Tunnel. His published books include *The Mersey Tunnel* and *The Simplon Tunnel*. He died Nov. 13, 1921.



Sir C. Douglas Fox,  
British engineer  
Russell

**FOX, CHARLES JAMES (1749-1806).** British statesman. Born in London, Jan. 4, 1749, he was a younger son of Henry Fox, Lord Holland; his mother was a daughter of the duke of Richmond. He was educated at a school at Wadsworth, at Eton, and at Hertford College, Oxford. He read widely, and his industry, coupled with his great natural abilities, made him a scholar. In addition to a knowledge of the classics, he was a good French scholar and read Italian well. He was only a boy when,



C. J. Fox

After Reynolds

encouraged by his father, he began his career as a gambler and shared the other pleasures of his dissolute elders. In 1769 he entered Parliament as M.P. for Midhurst, his father's pocket borough, and in 1770 he was made a junior lord of the admiralty under Lord North. In 1772 he resigned owing to his opposition to the court, but in 1773-74 he was again in office as a junior lord of the treasury.

Fox's career as a Whig leader may be dated from 1775. By then he had won the friendship of Burke, and had shown, in the case of the American colonies, for instance, that attachment to the cause of popular liberty which is the outstanding feature of his political career. He acted with the Whigs, then led by Lord Rockingham, but in many matters he was more advanced than they. His creed included parliamentary reform and purity in financial affairs, while, like many others, he saw a danger to the state in the undue influence of the crown. Soon came his advocacy of the repeal of Roman Catholic disabilities and of the causes of Ireland and the slave.

In 1782 Fox entered the cabinet of Lord Rockingham as secretary of state, but in a few months the premier died, and, refusing to serve under Lord Shelburne, he joined Burke and Sheridan in a Whig secession which in 1783 resulted in the extraordinary coalition between Fox and Lord North. In this the former was again a secretary of state, but this ministry had but a brief life. It was dismissed by the king as soon as the House of Lords had rejected Fox's India Bill.

Fox, who in 1784 had fought at Westminster—for which constituency he had been first returned in 1780—one of the most fiercely con-

tested battles in electoral history, now appeared as a leading opponent of Pitt's ministry, although on some matters—the impeachment of Hastings, for instance—he was in agreement with the premier. In 1789 came his famous declaration of welcome to the French Revolution, an encomium on the fall of the Bastille, and in 1791 his long friendship with Burke came to an end on this issue. By 1792 the majority of the Whigs had ceased to hail the Revolution with rapture, regarding it rather as a tyranny; but Fox, almost alone, continued to support it. He declared against the war with France, but by now he had few followers, and after 1797 he ceased for a time to attend parliament. In 1798, for declaring publicly for the sovereignty of the people, his name was removed from the list of privy councillors.

About 1802 Fox returned to public life. He remained in opposition until the death of Pitt in 1806, when he again became a secretary of state, this time in the ministry of all the talents. He then endeavoured to negotiate a peace with France, but he soon realized that he had misread Napoleon's character. His health was already failing, and on Sept. 13, 1806, he died at Chiswick. He is buried in Westminster Abbey.

The vices and the virtues of Fox were both on the large scale. A leading member of the dissolute circle that surrounded the Prince Regent, he lost an ample fortune at cards, and was more than once bankrupt, dependent upon the charity of his friends. He showed, as did others, a lack of consistency between words and deeds, while he was capable of carrying his private animosities into public life. For constructive statesmanship he showed no ability whatever. On the other hand, he was a great orator and a greater debater. To the last his mind maintained its freshness by contact with the masterpieces of literature. He possessed a really generous nature, while his sympathy with the oppressed was the outcome of genuine feeling. He was long the idol of the Whigs, among whom his is undoubtedly the greatest name. In 1785 he married his mistress, Mrs. Armistead, and his later life was passed at St. Anne's Hill, near Chertsey. He began a life of James II, was something of a sportsman, and had fought a duel. See Pitt.

A. W. Holland

*Bibliography.* *Memoirs and Correspondence of C. J. Fox, 1853-57; Life and Times of C. J. Fox, Lord J. Russell, 1859-66; Early History of*

C. J. Fox, Sir G. Trevelyan, 1880; Charles James Fox, J. le B. Hammond, 1903; and The Holland House Circle, Lloyd Sanders, 1908.

**FOX, GEORGE** (1624-91). Founder of the Society of Friends (*q.v.*). He was born at Drayton-in-the-Clay (now Fenny Drayton), Leicestershire, in July, 1624, son of Christopher Fox, a weaver, called by his neighbours "righteous Christer." His early bent towards religious



George Fox,  
English Quaker

study suggested to his relatives that he should be made a priest. He was, however, apprenticed to a shoemaker and grazier in Nottingham. At the age of 19 he began a series of solitary wanderings in which he sought peace of mind from both churchmen and non-conformists, finally to decide that the one great qualification for the ministry was the presence of God in the heart—the inspiration of the Inward Light.

In 1648 he began to preach in public, adopting the terms "thee" and "thou," opposing many social conventions as well as ecclesiastical formalism, refusing to take oaths, condemning war, and advocating a rigid simplicity of dress. By 1658 communities of his followers were established in all parts of England. Founder and followers were, however, bitterly persecuted.

In 1669 he married Margaret Fell, of Swarthmore Hall, one of his early converts. He visited Scotland, 1657; Ireland, 1669; North America and the West Indies, 1671-72; and Holland, with Penn and Barclay, 1677 and 1684. Shortly after a meeting at the Friends' Meeting House, Gracechurch Street, London, he died close by at the house of Henry Gouldney, in White Hart Court, Jan. 13, 1691, and was interred in the Friends' Burial Ground, Whitecross Street, Bunhill Row.

A man of sterling character whose practical gifts were displayed in the organization he gave to the society he founded, his voluminous writings are now seldom read, with the exception of his *Journal*, which, revised by a committee under the superintendence of Penn, first appeared in 1694. The MS. was sold at Sotheby's, July 26, 1920, for £1,750, and is now in the possession of the Society of Friends. See *Life*, T. Hodgkin, 1896; *The Fells of Swarthmore Hall and their Friends*, M. Webb, 1865; *Fox and the Early Quakers*, A. C. Bickley, 1884.

**FOX, SIR STEPHEN** (1627-1716). English courtier and founder of the family of Fox. Born at Farley, Wiltshire, March 27, 1627, he came into touch with Charles II through the Percy family, in whose service he was. He was very useful to the king in managing his personal affairs during his exile, and after the restoration many offices were given to him. In 1661 he entered Parliament as M.P. for Salisbury, and he remained therein during the greater part of his life, holding offices also under James II, William III, and Anne. For long Fox was paymaster-general, and the profits of this office made him very rich. Some of his wealth was spent in building churches and almshouses, but the bulk of it passed to his sons. He died at Chiswick, Oct. 28, 1716. Fox was the father of the 1st Lord Holland and of Stephen, who was created earl of Ilchester, and the grandfather of Charles James Fox. See *Holland*, Baron; *Ilchester*, Earl of.

**FOX OR FOXE, RICHARD** (c. 1448-1528). English statesman and prelate. Born at Ropesley, Lincs, the son of a yeoman, he was for a time at both Oxford and Cambridge. In 1485, in France, he entered the service of Henry VII. He began as the king's secretary, but was soon lord privy seal. Already ordained, and vicar of Stepney, he was made bishop of Exeter in 1487; in 1492 he was translated to Bath and Wells, and in 1494 to Durham. From 1501 until his death he was bishop of Winchester.

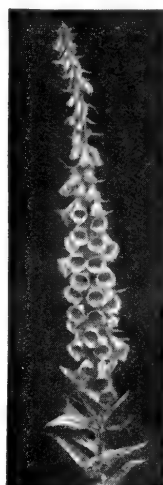
Fox was Henry's chief adviser, and most of the diplomatic work passed through his hands, including the momentous marriage and commercial treaties of this reign. Soon after the accession of Henry VIII, however, he lost his power. He was too steeped in the peaceful traditions of Henry VII to approve of the spirited foreign policy of the new era. Wolsey was too strong for him, and he resigned the privy seal in 1516. He died at Winchester, Oct. 5, 1528, being buried in the cathedral. Fox's great work was the foundation of Corpus Christi College, Oxford. At Cambridge he was chancellor and master of Pembroke Hall.

**FOXE, JOHN** (1516-87). English martyrologist. Born at Boston, Lincs, and educated at Oxford, he was a fellow of Magdalen, 1539-45. He was a tutor in the Lucy family at Charlecote, and in the Howard family at Reigate. During Mary's reign he lived on the Continent, where he met Knox and other reformers, publishing in Latin at Strasbourg the first draft of his *Acts and Monuments*, familiarly

known as *Foxe's Book of Martyrs*. On Elizabeth's accession Foxe returned to England, was ordained priest by Grindal, lived in Grub Street, where he worked on his *Acts and Monuments*, published in folio by John Daye, 1562-63. He became prebend of Salisbury and vicar of Sipton, 1563; and preached at Paul's Cross. He died April 18, 1587, and was buried at S. Giles's, Cripplegate. His principal work was a great favourite with Bunyan, greatly influenced the progress of Protestantism in England, and, although bitterly prejudiced, is an example of vivid prose.

There have been a large number of editions of the *Book of Martyrs*, and copies of the early ones are very valuable.

**Foxglove**. Hardy biennial and perennial plants of the natural order Scrophulariaceae and genus



Foxglove. Flower  
of *Digitalis purpurea*

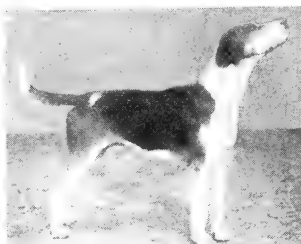
*Digitalis*. Only one is a native of Great Britain, although there are a number of other species, the majority being of botanical value only, which were introduced from Western Asia and Southern Europe. Their height is from 2 ft. to 5 ft., and their flowers are purple, pink, white, yellow, or brown. Foxgloves are raised from seed sown in gentle heat in May, the plants being moved to

the open air as soon as they are large enough to be shifted with safety. In sheltered shrubberies and copses a little seed may be sown annually in the open air at the spot where it is desired to cultivate the plants. In mixed borders foxgloves should be placed at the back, in association with delphiniums, hollyhocks, sunflowers, and other tall-growing subjects. The wild purple foxglove of our lanes and woods is *D. purpurea*. See *Digitalis*.



John Foxe,  
English martyrologist

**Foxhound.** Breed of hound specially maintained for hunting the fox. Of mixed origin, it is generally believed to be descended from the old type of bloodhound



**Foxhound.** Hound from the kennels of the Oakley foxhounds

and the pointer, with perhaps a dash of the bulldog strain.

Fox hunting dates from the days of Edward I, but the dogs then used were entirely different from the present breed of hounds, which is probably not more than 300 years old. The breed has received much attention, and such packs as the Belvoir and the Quorn are of world-wide fame.

The foxhound is notable for its speed and for its endurance, having been known to follow the fox for ten hours. A good foxhound should stand about 24 ins. high at the shoulder, but the females are usually 3 ins. shorter. The head should be large and full, the nostrils wide open. The short, rounded shape of the ear is the result of cropping when a puppy, and is intended to prevent the ears from being torn when going through thick cover. The back and shoulders should be strong and muscular, the hind quarters well formed, and the legs straight. The coat, which is always parti-coloured, should be short, thick, and smooth. *See Dog.*

**Fox Hunting.** Popular English sport. Fox hunting, as carried on in the 20th century, is a comparatively modern sport. The old-time sportsmen went out early in the morning, they hit on the drag of the fox, and the pack hunted steadily up to his kennel, where the fox had laid up for the day. Then began a chase which might often last for an hour or more. The hounds worked out the fox's line and wore him to death. But about 1750, the modern system of hunting was introduced in the Quorn country by Meynell and by Lord Spencer in the Pytchley Hunt. Hounds and horses were bred for speed, and the foxchase became, in the words of Beckford, "short, sharp, and decisive." The stud records of the Earls Spencer show that in breeding their hunters they tried

for speed, using the very best racing blood of their time. A number of hard-riding men of all classes were attracted to the sport.

The ideal hunt was one lasting about 15 or 20 minutes. The fox was raced, not hunted to death. It required a good horse to live with the pack even for this short time, but it was not only the horses and hounds that were the faster; the huntsman was quicker in his methods. The older school would wait when the fox broke until all the pack were collected; the huntsmen of the new school went away with three couples, leaving the rest to come as they could, or trusting to the whippers-in to bring them on. In the same way the new school of huntsmen would not persevere after a fox if he was lost. They went on to find another. This rapid style of hunting, and the taste for short, sharp bursts remains, but it flourishes chiefly in those hunting countries which consist of wide, spreading grass fields, of from 50 to 100 acres, and where the coverts are rarely above 40 acres in extent, and in many cases are little spinneys or gorses, like Norton Gorse, or Sheepthorns, in the South Quorn country, of about three or four acres.

It is clear that where there are large woodlands, wide heather-clad moorland, or where the enclosures are small, these methods of hunting must be modified, and while in the most fashionable countries, or in parts of them, the ideal of a short and fast gallop remains, there are many hours of steady, slow hunting. One of the charms of hunting is its infinite variety, and riding to hounds is not its only, not indeed, for many men, its chief charm.

This is shown by the fact that hunting flourishes, not only in the Midlands and in grass countries, but also in the rougher, colder scenting districts, where woodland and ploughland abound.

Many men find their chief pleasure in the working of the pack, and there is also great interest in the woodcraft required to find and kill a fox. For example, a good woodland huntsman, in countries where the woods extend from 1,500 to 3,000 acres or more, knows that it is useless to look for a fox in all parts of the wood, but leads his hounds to those spots which his experience or observation tells him are likely haunts. In the same way a good huntsman learns the run of his foxes, i.e. the course usually taken by individual foxes, and is thus able to help his pack at critical moments.

The great popularity of hunting may be gathered from the fact that there are about 240 fox-hunting establishments in Great Britain. The cost of hunting is met by those who hunt. In most cases the master finds from half to two-thirds of the money required, which is roughly estimated somewhere near £1,000 per annum for each day in the week hounds are out. Thus a pack going out two days in a week would cost £2,000 a year; four days £4,000, and so on. Some country packs might cost less, but the Quorn and Pytchley, Badminton or Belvoir, for example, would require £8,000 or £9,000 a year at least.

This money is spent on wages for the huntsman, two whippers-in, two second horsemen, a stud groom, a feeder, and two or more kennel men or boys, according to the number of hounds kept in kennel,



**Fox Hunting.** Scene with the Quorn hunt at Twyford Brook; the pack in full cry

*After A. C. Havell, by courtesy of Forest*

ranging say from 20 to 75 couples, or even more. Then there is oatmeal and horseflesh for the hounds, and oats and hay for the horses. Another portion of the money goes into the pockets of local artificers and tradesmen, while large sums are distributed to farmers and others, as compensation for damage to fences or the loss of poultry.

One of the beneficial results of hunting is that the sums of money spent in recreation are distributed in districts which would otherwise receive none. If to the actual expenses of the hunt are added the sums paid by those whom hunting attracts to the neighbourhood, it will be seen that hunting causes the distribution of a very large sum. But this is not all.

#### Hunting and Horse Breeding

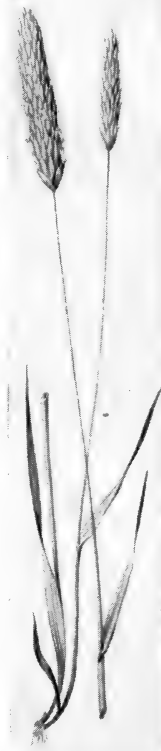
Great Britain is largely dependent for its horses on hunting people, who support the market for breeders of the best sort of riding horses, and thus keep a large horse reserve at no expense to the nation. English hunters are the best riding horses in the world, and are eagerly sought for by foreign and colonial buyers. The needs of the hunting man or woman practically regulate the type of the hunter which breeders strive to raise, and thus there is a large export trade in riding horses which rests on hunting. But hunting requires hounds, and the English foxhound is the greatest triumph of the breeders. There are many different breeds of hounds hunting by scent in Europe and America, but the English foxhound in make, shape, nose, and pace beats them all. In England foxhounds hunt all the three kinds of deer, the fox, the hare, and the otter. In France many packs are wholly pure foxhound, or the native breeds are largely crossed with foxhound blood.

The fox is a small animal, which in England, except in the Fell countries where 19 or 20 lb. is not unusual, averages about 10 lb. to 12 lb. weight, which can crawl down a 9-in. drain. The fox's great quality as a beast of chase is its wildness. Wild foxes are necessary, and for these the goodwill of covert owners and farmers has to be depended on. In spite of some grumbling, people recognize the value of hunting in encouraging the breeding of horses and the training of men. Fox hunting is not only or chiefly a rich man's sport, but gives pleasure and profit in England and Ireland to people of all classes. See *Life of a Fox*, Thos. Smith, 1920; *Hunting the Fox*, Lord Willoughby de Broke, 1920.

T. F. Dale

**Foxtail.** Means of preventing a bar of wood or metal bolt from being withdrawn from a hole. The entering end is split, the point of a wedge is inserted, and the bar is driven home, the wedge expanding the material against the sides of the hole.

**Foxtail Grass** (*Alopecurus pratensis*). Perennial grass of the natural order Gramineae. It is a native of Europe, N. Africa, and Asia. It sends out runners from the roots, and has flowering stems from 1 ft. to 3 ft. high. The leaves are rough and flat; the flowers form a soft, cylindric panicle. It is a most valuable meadow-grass, and of high nutritive value.



Foxtail Grass,  
*Alopecurus pratensis*

It is a most valuable meadow-grass, and of high nutritive value.

**Fox Terrier.** Small breed of terrier. It was formerly used in the hunt for unearthing the fox. To some extent it is still used for this purpose, and is used for ratting. It is deservedly popular as a companion for man and as a house dog, for which it is eminently qualified by its intelligence and friendly disposition. No breed looks quite as smart and alert as a good fox terrier, and no other dog seems to be in such complete sympathy with its master. It is affectionate to the degree of being sometimes troublesome; readily learns



Fox Terrier. A prize winner in the London Fox Terrier Clubs' Championship show

to obey orders, and often displays an intelligence almost human.

There are two breeds, the smooth and the rough coated. The former is perhaps the favourite as a companion, but the latter possesses the better hunting instincts. To judge by the show records, the smooth variety came into favour with breeders earlier than the other. In colour the fox terrier should be black, white and tan; specimens that show liver-coloured markings should be avoided. Of recent years there has been a tendency to introduce a bulldog strain into the breed with a view to develop a stronger jaw, but the wisdom of this is still a matter of controversy. In everything except coat, the two varieties are identical. See *Dog and illus.* on colour plate; Mammal.

**Fox-trot.** American dance. It originated in a dance, consisting of alternate slow and rapid movements, performed by a music-hall artist. To this he gave the name Fox-trot. It seized upon the imagination of the audience, was adopted as a social dance for two; and was brought to France and England early in the 20th century, with many variations.

**Foy, MAXIMILIEN SÉBASTIEN** (1775-1825). French soldier. Entering the army in 1791, he first saw service under Dumouriez. Distinguishing himself in Italy, 1801, and in the Austrian campaign, 1805, he was sent by Napoleon in 1807 with a small force to Turkey to assist the sultan against the Russians and British. In 1808 he was in Spain, and fought in the Peninsular War, being made a divisional general in 1810. He held a command at Waterloo. After 1815 he made his peace with the new régime and sat in the French Chamber. He died at Paris, Nov. 28, 1825. His *History of the Peninsular War* was published in 1827.



Maximilien Foy,  
French soldier

**Foyers.** Two cascades (40 ft. and 165 ft.) near the mouth of the Foyers river, on the E. side of Loch Ness, Inverness-shire, Scotland. Since 1895 they have been used by the British Aluminium Company for generating electricity.

**Foyle.** Lough or inlet between cos. Donegal and Londonderry, Ireland, into which drains the river Foyle, 16 m. long. It is 18 m. long and has a width of 1 m. at the entrance, and an extreme width of 10 m. Dangerous shoals obstruct navigation on the W. side.



**F.P.** Abbreviation for fire plug.

**Fraction** (Lat. *fractio*, from *frangere*, to break). Arithmetical expression of the relation of a part to the whole. The simplest fractions express this relationship in the case where the whole contains the part an exact number of times; e.g. if there are seven equal parts each part is a seventh of the whole. The next step is the adding together of several such simple parts, to form a fraction like three-sevenths. Simple as this step may seem to the modern reader, it was beyond the mental grasp of the ancient Egyptians, who could realize this type of fraction only in the easy cases of two-thirds and three-quarters.

The handling of such fractions is greatly facilitated by their expression, in the Arabic notation, by two numbers separated by a bar; thus, three-sevenths is written  $\frac{3}{7}$ ; 3 is technically called the numerator and 7 the denominator. Such a fraction as  $\frac{3}{7}$  is called a vulgar fraction, in contrast with a decimal fraction, the denominator of which is either ten or a power of ten. This denominator, being understood, may be suppressed; thus  $\cdot 39$  is interpreted to mean  $\frac{39}{100}$ . The decimal system affords great advantage in the comparison of fractions with different denominators (e.g. it is not immediately obvious that  $\frac{7}{11}$  is greater than  $\frac{6}{7}$ , but when expressed decimally as  $\cdot 63$  and  $\cdot 625$  respectively, the fact is at once evident), and in computations where exact accuracy is not required, but it has the disadvantage of being cumbersome for the exact expression of some of the commonest fractions, such as one-third, which is expressed as  $\cdot 3$ , one-eleventh  $\cdot 09$ , or one-seventh  $\cdot 142857$ . Thus it is impossible to divide a dollar or a franc into three equal parts. See Arithmetic; Decimal System.

**Fracture** (Lat. *fractura*). Word meaning breakage, but specially applied to breakages of the bones. These are usually caused by external violence, which may be direct or indirect. A fracture caused by direct violence occurs at that part of the bone lying beneath the tissues which are actually struck. Indirect violence breaks the bone at some other part. For instance, a blow on the side of the chest will break the ribs at the spot actually struck and drive the fractured ends inwards; but if a cartwheel passes over the chest of a person lying on his back on the ground, the ribs break by indirect violence at the point of maximum curvature, and the fractured ends tend to turn outwards. Powerful muscular effort will sometimes fracture a

bone. Thus the effort made by a person who stumbles to save himself from falling, sometimes fractures the patella or knee-cap; and the upper arm bone has been broken by the vigorous throwing of a cricket ball.

Conditions predisposing to fracture are diseases which cause atrophy or weakness of the bones, such as rickets. In certain forms of lunacy the bones may be so weakened as to fracture from a slight effort or accident, a condition which has several times given rise to groundless accusations of ill-treatment. In a simple fracture there is no communication between the seat of fracture and the external air; in a compound fracture the skin or mucous membrane is so torn or injured as to bring about this communication. In a comminuted fracture the bone is broken into more than two pieces, and in an impacted fracture the ends of the bones are driven into each other. A fracture which does not completely break the bone, but bends and splits it, is termed a green-stick fracture, and is most often seen in young children whose bones are relatively soft. A fracture of the skull which has resulted in the driving in of a piece of bone is a depressed fracture.

The general treatment of a fracture consists in first setting the broken bone, i.e. bringing the broken ends into opposition with each other in the normal position. This is done by manipulation, and as the process may be very painful, and muscular spasm may hinder the replacement, it is often desirable to place the patient under an anaesthetic. The broken bone is next secured in normal position by means of bandages, splints, and, in appropriate cases, plaster of Paris. The limb must be kept at rest while re-union is occurring, but as disuse leads to considerable weakening and atrophy of the muscles, the limb should be massaged daily, usually within a period not longer than a fortnight after the injury. Gentle passive movements of the limb are also begun early in order

to prevent contraction of the ligaments and stiffness in the joints.

With single fractures in which the bones are readily maintained in good position these methods are usually sufficient, but for more complicated fractures, and when there is much displacement, operative measures are often desirable, the fragments of bone being bound together by silver wire or, in appropriate cases, united by metal plates. Compound fractures demand thorough cleaning of the injured tissues and removal of all loose fragments of bone, which are apt to undergo necrosis if left in the wound. If suppuration has occurred, the insertion of drainage tubes is generally necessary. Plating or wiring is not as a rule desirable in these cases. See First Aid; Surgery.

**Fra Diavolo** (1771–1806). Nickname of Michele Pezza, an Italian brigand. Originally a monk, he became an outlaw chieftain in the mountains of Calabria, where his atrocities earned him his nickname (Brother Devil). Ferdinand of Naples made him a colonel, and with Cardinal Ruffo he raised a revolt against the French in 1799. In 1806 he made a similar attempt, but was caught and hanged in Naples as a bandit. Nov. 10, 1806.

**Fra Diavolo.** Opera by D. F. Auber, nominally founded on the misdeeds of the brigand of that name. The full title of the opera is *Fra Diavolo, ou l'Hôtellerie de Terracine*; the libretto was by



Fragonard. The Swing, one of the artist's most delicately executed masterpieces, painted about 1769

Wallace Collection, London

Scribe, and it was first produced at the Opéra Comique, Paris, on Jan. 28, 1830.

**Fragonard, JEAN HONORÉ** (1732-1806). French painter and engraver. Born at Grasse, in Provence, April



**J. H. Fragonard,**  
French painter  
After Gerard

5, 1732, he studied under Boucher and Chardin, and, having won the Grand Prix in 1752 at Rome, in 1763 he returned to Paris, was received into the Academy in 1765, and shortly afterwards abandoned classical painting for the freer style appreciated by the Court. During the Revolution he retired to Grasse, where he completed the five paintings of *The Lover's Progress*, now in the Pierpoint Morgan collection and exhibited at the Guildhall in 1902. He returned to a changed Paris, and died there poor and neglected, Aug. 2, 1806. Apart from the Grasse pictures, his most famous works are in the Louvre and the Wallace Collection: *Coresus and Callirrhoe*, *The Music Lesson*, and *The Storm*, in the Louvre, and *The Swing*, in the Wallace Collection. His crayons and water-colours are charmingly facile.

**Fragson, HARRY.** Stage name of the British comedian, Leon Pott, (1870-1914). Born at Brixton,



**Harry Fragon,**  
British comedian

after a few years in business at Richmond he went on the stage and gave imitations of Paulus, then a well-known star of the Paris music halls. Meeting with little success in London, he moved to Paris, and after living in poverty made a success with his *Ronde des Petits Cochons*. By this time he had learned French perfectly. He soon gained popularity in France, and in 1904 appeared in pantomime at Drury Lane, where he made a success with his *Love, love, whispers of love*. Equally versatile in English and French, he was at the height of his popularity in both countries when he was murdered by his father, Jan. 1, 1914.

**Fraizer, ALEXANDER** (c. 1610-81). English physician. Of Scottish ancestry, he received his medical education at Montpellier. Having settled in London, he be-

came known at court, and when Charles II went abroad, after the execution of his father in 1649, Fraizer went with him in a professional capacity. He mixed also in the politics and intrigues that surrounded the exiled king. He returned to England at the Restoration, and remained in attendance on the royal family until his death, May 3, 1681. An incident in his career was his arrest for debt at the instance of Sir E. B. Godfrey, this being resented by the king to the extent of putting Godfrey in prison and punishing the bailiffs who carried out the order.

**F.R.A.M.** Abbrev. for Fellow of the Royal Academy of Music.

**Fram** (Norweg., forward). Three-masted schooner of 402 tons built in 1892 for Nansen's Arctic



**Fram.** The polar exploration ship after she had been converted from steam to oil for Amundsen's expedition in 1910

expedition. She was 117 ft. in length, with triple external planking ranging from 24 ins. to 28 ins. in thickness, and auxiliary engines driving a screw propeller. Nansen sailed in her in Aug., 1893, and entering the ice at the new Siberia Islands, drifted northward. In June, 1895, he left the ship and marched north as far as 86° 13.6'. In May, 1897, he fell in with the Jackson-Harmsworth expedition, with whom he returned in the *Windward* to Norway, whither the *Fram* also returned safely. In 1899 the ship was used by Sverdrup in his exploration of Jones Sound, in the N. of Baffin Bay.

In Aug., 1910, Captain Roald Amundsen (*q.v.*) left Norway in the *Fram*, intending, like Nansen, to drift across the North Polar basin, but, changing his programme, made his way from Madeira to the Antarctic regions. The ship was next heard of in the Bay of Whales, where Captain Scott discovered her while cruising along the Ice Barrier. Amundsen wintered near King Edward VII Land, and having accomplished his march to the South Pole, rejoined the *Fram*, aboard which he arrived at Hobart,

Tasmania, March 7, 1912, and later returned to Norway. See Nansen.

**Framboesia** OR **YAWS** (Fr. *framboise*, raspberry). Infectious and contagious disease caused by infection with a minute spiral-shaped organism, *Treponema pertenue*, discovered by Castellani in 1905. The disease is almost confined to tropical and sub-tropical regions, being most prevalent on the W. coast of Africa, in Tripoli, the Malay Peninsula, Assam, Java, Ceylon, the West Indies, Samoa, and Fiji.

Three stages are recognized. The primary stage usually begins with symptoms of general ill-health, headache, rheumatic pains, and a rise of temperature. In from two to four weeks after inoculation a papule appears on the skin at

the point where the organism has entered the body, which may be an old ulceration, a scratch, or even an insect-bite. The papule may develop into a large nodule, or become ulcerated and subsequently heal. The second stage usually begins between one and three months after the primary lesion has appeared, and is characterised by

the eruption of papules more or less all over the body, some of which develop into large granulomatous nodules, which may later become hard and wart-like.

In most cases these disappear within a year, and the patient recovers. In some instances, however, the third stage develops. Nodules may appear in any of the tissues, and deep ulcers may be formed. Contractions of groups of muscles are frequent, and painful nodes may develop on the bones. The disease is rarely fatal, but it is a cause of much sickness. Treatment by injection of salvarsan has been found very effective, and is now widely adopted. The disease is quite distinct from syphilis, with which it was at one time confused.

**Frame.** Border or case in which a picture is set for exhibition on a wall. It may be made of various materials, and should have some regard for the character of the picture. An oil painting, being in a strong medium, will tolerate a heavy gilt frame which would "kill" a slighter medium, such as a water-colour. Engravings are framed in oak, walnut, maple,

rosewood, and gold; but etchings and all prints in which the work is light, sketchy, or delicate should be framed in a plain and simple strip of black or dark wood. Fine prints are better unframed and kept in special portfolios.

**Frame.** Term used in engineering for a structure built up of members which are joined together. The theory of frames, which deals with the least number of members necessary to keep them rigid, and with the strengths of the individual members, is one of great importance in engineering. In a printing office the wooden structure on which are placed the cases at which a hand compositor works is called a frame. *See Mechanics.*

**Framework Knitters' Company.** London city livery company. It came into existence with the invention of silk stockings, and was granted its first charter by Cromwell in 1657. A second charter was granted by Charles II in 1663 to "the wardens, assistants and society of the art and mystery of Framework Knitters in the cities of London and Westminster, the kingdom of England, and the dominion of Wales." The powers were limited by Parliament in 1753, the hall in Red Cross Street, E.C., was sold in 1821, and the plate in 1861, the proceeds being devoted to the Bourne almshouses in Kingsland Road. Corporate income, £310; trust income, £352; offices, 18, Essex Street, W.C. *See The Framework Knitters, H. C. Overall, 1879.*

**Framlingham.** Market town of Suffolk, England. It is a station on the G.E. Rly., 22 m. N.E. of Ipswich and 90 m. N.E. of London. S. Michael's Church, with a tower 95 ft. high, contains tombs of some

of the Howards, including that of the earl of Surrey, the poet. The castle is a fine ruin. The remains include a gateway, the outer walls, 13 towers, and a moat; it was the stronghold of the Bigods, and later of the Howards, both families holding the earldom of Norfolk, in the lands of which the place lay.

Framlingham College is a public school in large grounds. Built to commemorate the Prince Consort, it was opened in 1865 as the Albert Memorial College. Framlingham is an old place, having existed before Roger Bigod built a castle here about 1100. Its history is really that of the castle, which was more than once forfeited by the Howards, but restored to them. They lost it finally in the 17th century. Market day, Sat. Pop. 2,400.

**Frampton, SIR GEORGE JAMES** (b. 1866). British sculptor. He studied under W. P. Frith, and at the R.A. schools; later, under P. Mercié and Dagnan-Bouveret in Paris. He first exhibited at the R.A. in 1884, was elected A.R.A. 1894, and R.A. 1902, and knighted in 1908. As a decorative sculptor he is in the front rank, excelling in polychromatic figure work and architectural skill. Among his works are the bronze memorial to Charles Mitchell, 1898; S. George, 1899; statue of Queen Victoria, Calcutta, and the Edith Cavell (*q.v.*) memorial in London, 1919.

**Franc.** French silver coin, the unit of the French decimal monetary system. The name comes from the inscription *Franco-rum Rex*, king of the Franks, on the obverse of the gold coin issued by John II in 1360. It was then the equivalent of the livre, and consisted of 20 sols. Gold francs were also coined by Charles V of France, and in 1575 Henry

III issued silver francs. In 1641 Louis XIII substituted the silver louis, but the name of the franc



Franc. Left to right, reverse sides of French, Belgian, and Swiss francs, actual size

survived the actual coin and was long synonymous with the livre. In 1795 the franc was again established, superseding the livre, and, consisting of 100 centimes, remains the unit of French currency, the standard being the gold piece of 20 francs.

An integral part of the metric system of weights and currency, its weight is exactly 5 grammes (78 grains), and it is the standard of the Latin Monetary Union (*q.v.*), which adopted it in 1865. The coin has the same name in Belgium and Switzerland. 20- and 10-franc pieces are of gold, 5-, 2-, 1-, and ½-franc pieces are of silver. French francs are nominally reckoned at 25 to the £ sterling, but the Great War caused great fluctuations of value. *See Coinage.*

**Français, ANTOINE** (1756-1836). French politician. He was born at Beaurepaire and sat in the legislative assembly of 1791, noted as a bitter anti-clerical. Under the consulate he was prefect of Charente-Inférieure, and held high fiscal positions; he was made count by Napoleon, and died March 7, 1836.

**François, FRANÇOIS LOUIS** (1814-97). French painter. Born at Plombières, Vosges, Nov. 17, 1814, he studied art under Corot and Jean Gigoux. Among his works are *A Song* under the Willows, with figures by Baron, in the Park of St. Cloud, with figures by Meissonier, an Italian Sunset, in the Luxembourg, and decorations in the Church of the Trinity. He died at Paris, May 28, 1897.

**Francatelli, CHARLES ELMÉ** (1805-76). British cook. Born in London of Italian parentage, Francatelli became, in turn, cook to several noblemen, to Crockford's Club, and to Queen Victoria. His fame as a cook of the highest skill was widespread, and he published *The Modern Cook*, 1845; *The Plain Cookery Book for the Working Classes*, 1861; and other works. He died Aug. 10, 1876.

**Francavilla Fontana.** Town of Italy, in the prov. of Lecce. It is 22 m. by rly. E.N.E. of Taranto and trades in oil, wine, and leather goods. Pop. 21,527.



Framework Knitters' Company arms



Sir George Frampton, British sculptor



Framlingham, Suffolk. Walls of the ruined castle, with the workhouse built when the castle was dismantled in the 17th century

Frith

# FRANCE: ITS HISTORY AND CULTURE

HAMILTON FYFE, W. H. HUDSON and F. J. MACLEAN

*The various sections of this article are each supplemented by shorter entries, e.g. those on the cities, towns, and rivers of France, those on the kings and statesmen, and those on its artists and men of letters. See also Franks; French Revolution; Hundred Years' War; Architecture; Furniture*

France is a country of vast plains, for the most part of great fertility; of high, inhospitable plateaux; of noble rivers; and of mountain ranges which serve as land frontiers. Its area is 212,659 sq. m., including the territories restored as a result of the Great War.



France. Arms of the Republic

The districts of Lower Alsace, Upper Alsace, and Lorraine are now the depts. of Bas-Rhin (area 1,848 sq. m.), Haut-Rhin (1,354 sq. m.), and Moselle (2,403 sq. m.). With the English Channel on the N., the Atlantic on the W., and the Mediterranean washing the E. half of its southern side, the country is well provided with harbours. The ports of greatest commercial importance are Havre, at the mouth of the Seine, Brest, St. Nazaire, at the mouth of the Loire, La Rochelle, Bordeaux, on the Garonne above the estuary of the Gironde, Marseilles, at the mouth of the Rhône, and Toulon.

The mountain ranges which divide France from Switzerland, Italy and Spain are the Jura, the Alps, and the Pyrenees. The Vosges, which, until the restoration of Alsace and Lorraine, served as frontier between France and the German Empire, are not high. At the S. end of the Vosges is the Trouée de Belfort, through which invaders have passed many times. It is literally a "hole" between the Vosges and the Jura; through it runs a canal connecting the Saône with the Rhine, also the rly. into Germany and Switzerland.

## The Jura and Alps

The Jura forms an extensive limestone plateau, well populated and productive. The hills, of no great height, are wooded, and the sheltered valleys between them are both cultivated and valuable for cattle-raising.

S. of the Jura begin the Alps, with Mont Blanc as the first of the giants; its northern approaches have been on French territory since Savoy was taken by France from Italy in 1860. Extending S. from Savoy, the Alps run almost to the sea behind Cannes and Nice, while in a W. direction they become the Alps of Provence, and stretch nearly to the Rhône. Around the

Gulf of the Lion, often incorrectly called the Gulf of Lyons, which takes its name from the likeness of its shape to a lion asleep, there is flat land for some distance inland; but at the extreme S.W. point of the gulf the Pyrenees begin.

On French soil the Pyrenees run eastward for 230 m., several of the peaks reaching heights of nearly 10,000 ft. Without the grandeur of the Alps, lacking vast glaciers and fields of eternal snow, they are preferred by most French people, and holiday resorts, such as Luchon and Cauterets, are full all summer and autumn. Pau, whence the best view of the chain of the Pyrenees is obtained, is more frequented by English visitors. No rly. cuts the Pyrenees, owing to the height of the passes. The lines run by the Gulf of the Lion at one end and along the Atlantic coast at the other. In many parts of the Pyrenees the inhabitants are almost as much Spanish as French.

Thus, if France be regarded as a rough square, it is seen to have mountains on its E. and S. sides, while on the W. and N. its frontier is the sea. There is, however, another French mountain system independent of the others, and separated from them by later geographical formations. This includes the high central plateaux, somewhat to the S. of the exact centre of the country; it consists of the Cevennes mountains, those of Auvergne (the Margeride), the Monts Dore, the Puy-de-Dôme, and the Causses, which, although barren and monotonous, reveal the most picturesque valleys of the entire region. In general, it is hard to cultivate successfully. The winters are long and cold, pasturage is poor, and most of the forests have disappeared. There are ranges of hills in Brittany and Normandy, there are the French Ardennes towards the Belgian frontier, but nothing in the N. or W. can be called a mountain.

Of the rivers the Loire is the longest (650 m.). Rising on Mont Gerbier-de-Jonc, in the dept. of Ardèche, for a long distance it flows through the rocky defiles of the central plateau. Then, joined by the Allier, it sweeps onwards

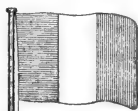
through the provinces which more than any other contributed to the formation and development of the French nation, the country of Touraine. Its course continues amid fertile fields and orchards as far as Nantes, where the estuary begins and carries it out to the ocean. Next in length comes the Rhône (507 m.), which flows from St. Gotthard range in Switzerland down into the Lake of Geneva. At Lyons it receives the Saône and then flows due S. in a delightful valley through vineyards, until it becomes sandy and shallow, and with a number of smaller streams makes the wide delta which gives its name to the dept. of Bouches-du-Rhône.

## Seine, Garonne, and Somme

The Seine rises in the E. of France and takes its course of 485 m. almost entirely through plains. It is, therefore, sinuous, but otherwise excellent for navigation. From Havre, where it runs into the sea, up to Paris, there is a large traffic. Rouen owes its importance to the Seine. Fourth among the great rivers comes the Garonne (378 m.), which is joined by the Dordogne near the ocean, the two forming the estuary of the Gironde. Here are the vineyards which produce the famous Bordeaux wines, most of them in the Médoc region. The Somme and the Marne are both in the Seine basin, though the former has its own outlet to the sea not far from Abbeville.

Except for the lakes of Geneva, Bourget, and Annécy, France has no large inland bodies of water. Her sea coasts, on the other hand, are of great length and value. Along the Mediterranean she has made of the Côte d'Azur a winter holiday ground for the people of all nations. On the Channel coast, in Brittany, and that part of Normandy which fronts the Atlantic, there are numerous *plages* (beaches), which in summer are thronged by visitors.

Various parts of the coast of France support fishing industries of considerable importance. The chief fishing ports are S. Malo, Boulogne, Fécamp, Groix, and La Rochelle; among the lesser, Paimpol, Dieppe, Douarnenez, Lorient, Yeu, Dunkirk, and Arcachon. From the ports of the Nord, Pas-de-Calais, Somme, and Seine-Inférieure, mackerel are sought: from those of the Atlantic sea-



France. Flag of the Republic



France. Map showing the departments, principal railway lines, and the frontier as determined by the Treaty of Versailles, 1919. Inset, the island of Corsica

board, tunny-fish and sardines; Boulogne and Fécamp have heavy herring-catches; cod fleets go out to the N. Sea and Atlantic from several Channel ports.

The N. and N.E. are the most fertile parts of the country. Most of the cultivation is done by peasant proprietors. The average size of the holdings is well under 25 acres, and only 2½ p.c. of the total number of farms are over 100 acres. At the same time it must be noticed that nearly half the total amount of land is owned by large holders. Since about 1870 the number of small farms which could support an owner and his family has shrunk; the number of peasants with holdings of an acre or two, who are obliged to hire

themselves out as labourers, has been increasing. Eighty p.c. of those engaged in agriculture own their land; of the remainder more than two-thirds pay rent, while the others work on the *métayer* system, which divides the produce between the cultivator and the owner of the land.

More wheat is grown than any other cereal; oats come next, then rye, which used to be the staple food of the people until wheat took its place. French farmers do not raise enough cattle and sheep to supply the national demand for meat, nor are their breeds of these animals exceptional. Horse-breeding is a national industry, and for heavy breeds of horses France is famous. The Percheron and some

Flemish stocks are unrivalled. In the S., however, there are few horses on farms. Hay is scarce, owing to the climate and the nature of the soil. Oxen are, therefore, used as draught animals, as in Italy and Spain. They are bred specially for this purpose, but generally end by being eaten. In many mountainous regions the goat supplies most of the milk and a large proportion of the meat.

France still enjoys its reputation as the land of good wine. Vine-growing is a form of cultivation employing large numbers and adding much to the country's prosperity, though the amount of land devoted to it has diminished, owing chiefly to the harm done by fungus and phylloxera. This insect did so much damage that it was



found necessary to import American vines and graft the famous French varieties on to them.

Vast quantities of fruit are produced in all parts—cherries, pears, apples, plums, and peaches, and in the S. oranges and lemons as well. Chestnuts and walnuts also yield large and profitable crops. Market-gardening is widely carried on, aided by the fertile soil and the high pitch to which intensive methods of culture have been brought; many families in the smaller towns and in country districts make a useful addition to their incomes out of small patches of garden-land.

Forests are well kept up, some by individuals, some by public authorities. Beeches and horse chestnuts are the trees most common, though in some parts oaks grow well. On the sandy soil of Landes, in the S.W., the fir flourishes.

These marshy districts are the poorest in the republic, excepting the mountains. The people form a race apart, the Basques, of Spanish origin, with language and customs differing from those of the rest of the population. They are quite unlike the other people of the S., who have more in common with Italians, being dark-haired, dark-skinned, dark-eyed, and of medium height. The northern French are much lighter in complexion. Pure Celts are still to be found in the Cevennes and in the central plateau as well as in Brittany.

#### Climate and Character

But although they are often classed with the Latins, the French have not, as a nation, the characteristics of a Latin race. To a certain degree they are affected by the climate. There is a great deal of difference between the hard winters of the E. provinces and the genial sunshine of the S. The N. is affected by the Atlantic; it has changeable, often damp, weather; in the centre, the winters are long and hard, in the W. they are short and mild. Thus the S. and S.W. people are more expansive than the rest; they are great talkers, quick-tempered, small eaters and sober.

One feature of the French character is much the same in all parts—they are all hard workers and their love of independence makes them thrifty. The small peasant farmers are the closest-fisted; they grudge any expenditure even on their own comfort. French housewives are good managers and can make a little go a long way. And the French woman is her husband's adviser and partner, often she understands his business, often she carries on a business herself. In all domestic economy hers is the de-

ciding voice. The manual labourer's wife does not have to ask him for money; she takes his wages and allows him so much out of them. One result of this is that women have more influence on the national life than in any other country, and as they are usually more cautious and provident than men, the habit of looking after the pennies has become engrained in the national character.

**TRADE AND INDUSTRY.** In industry and commerce, the French are averse from taking large risks. Their inventors are clever, and often take the lead when some fresh development of manufacture begins, as in the motor-car business and later with aeronautics. But they do not keep their pre-eminence; they let others who are more enterprising get ahead of them. French work is notable for its high finish and artistic quality. The articles produced for export are mostly luxuries. First among their industries is the fine textile, and the French have a reputation all over the world for fine silks, fine linen, and fine cloths. In metal-work they are famous for things of daily use, for much of their machinery they are dependent upon other countries. This is partly because France had not, until after the Great War, coal and iron near together in large quantities. Around Le Creusot they are found together, and that became one of the principal homes of the iron and steel industry. The normal output of coal is about 40,000,000 metric tons a year; of iron about 20,000,000. No other metals are found in any great bulk. Their technical skill has given the French their reputation. Their jewelry is unrivalled. In china and porcelain they keep up their old reputation; also in perfumes and women's dress.

#### Production of Luxury Wares

By far their largest export is manufactured silk. Raw silk also figures high up in the list. Wine is, of course, prominent, but it is surprising to find that much more is imported than exported. This is mostly Spanish and Italian wine which, being mixed with French, becomes Burgundy or Médoc. The bulk of coal imported is large. The French coal mines, of which the most productive are in the N., do not yield nearly enough for the manufacturer's needs. In their houses the French burn mostly wood, so the domestic demand is not heavy.

Soap is manufactured in vast quantities, in all degrees of refinement. Cheese-making is practised where there is good pasture; it is

enough to mention Camembert, Pont L'Évêque, Brie, and Roquefort. Sugar-making from beets is carried on extensively in the N. In and around Paris are the principal producers of luxury wares, but outside that region there are found many trades attached for some reason to certain localities, such as clock-making at Besançon, women's hat-making and hosiery at Troyes, porcelain at Limoges, tulle at Calais, table-glass at Baccarat, lace at Puy, Valenciennes, and elsewhere. As in most countries of Europe, the N. is more occupied with manufacture than the S., though Marseilles is an industrial centre as well as a large port, and Lyons has grouped round it probably the largest produce of silk, and has made itself the chief market for that important product.

#### State Monopolies

The State enjoys several manufacturing and industrial monopolies. That of tobacco, established by decree of 1810 and reorganized in 1916, is controlled by the administration of manufactures, which buys all French-grown tobacco and imports, when possible, the remainder called for. The match monopoly dates from 1889, there being six national factories. Certain explosives, but not dynamite or nitro-glycerine, are state products, and the artistic manufactures of Sèvres porcelain, and Gobelin and Beauvais tapestries are famed for a higher quality than are the first-named monopolies.

The chambers of commerce perform useful functions in the commercial and industrial life of the country. Numbering about 150, they are regulated by the law of 1898, advising the central government on commercial matters through the ministry of commerce, and organizing various commercial services of transport, etc. Since 1918 they have been associated in regional groupings, and during the Great War were responsible for the issue of local monetary notes. Another commercial centre of organization is found in the great fairs held at Lyons and Bordeaux, the former one of the most representative markets of all Europe.

**POPULATION.** Notwithstanding its fertile soil and many productive industries, France has a small population (41,475,523). No state in Europe has increased so little the number of its inhabitants during the past century. For half a century the population has been about the same. Economists, political thinkers, and religious teachers have all preached the dangers of this, but without effect. The mass of the French people are too



France. Map showing the main railway lines and the principal canals of the country

cautious and too comfortable to have large families. The proportion of marriages which yield only one child is very high. Even the peasant farmers, who use the labour of sons and daughters, are affected by the system which divides up landed property among all the children upon the father's death.

As a consequence of the smallness of the population in relation to the size of the country, French rlys. are imperfectly developed. The republic is well provided with trunk lines, but in most parts of the country local communications leave much to be desired. The total length of rlys. is between 25,000 and 26,000 m., not much greater than the length of the rlys. in the U.K., although the area of France is nearly double that of Great Britain and Ireland. They are mostly in the hands of private owners. One has been worked for a long time by the state (the *État* line), and more recently the western system was bought by the government. But this only gives the state between 5,000 m. and 6,000 m., whereas the companies, Paris-Lyons-Méditerranée, Nord, Est, Orléans, and Midi, have nearly 20,000 m. between them. There has been some agitation for nationalisation of all the systems, and in 1920 a strike was declared which had nationalisation, not for its

avowed, but for its real object. It was, however, a failure.

The canals of France are a most valuable auxiliary to the rlys., and are used regularly for the carriage of various merchandise. There are over 3,052 m. of them actually navigated out of 3,620 m. in existence. French roads are excellent. Those of the first class, national roads, are looked after by the state. In the second class come the departmental roads, kept up by the local government authorities; and in the third class district roads under the district councils.

**CONSTITUTION AND GOVERNMENT.** The local affairs of the country are entrusted in the first place to bodies elected by the inhabitants of each department. Their power is, however, limited; they have not the same authority as county councils in the U.K., because anything they decide can be ignored by the prefect of the department, an official appointed by the government. There are also sub-prefects whose duties are confined to smaller districts known as *arrondissements*. These also have councils representing the cantons under the control of sub-prefects.

A canton usually consists of twelve communes; communes may be either small villages or great cities. The commune is the basis of French local government. Its voters

elect a municipal council, whose decisions are subject to approval by the prefect, and sometimes by higher authorities. The head of the municipal council, the mayor, has control of the police, except in Paris and in Lyons, where they are under prefects. The largest communes are divided into cantons, which serve to link the commune and the *arrondissement*. Although in French local affairs, therefore, the people do not directly rule, yet the system works well on the whole.

The prefect is a figure of considerable importance in French affairs. Appointed by the president of the republic on the recommendation of the minister of the interior, he is held generally responsible for the government of his department, controls the administrative departments therein and their financial requirements, and acts as its legal representative. He is advised by the council of the prefecture. The general council of the department meets twice a year, with a departmental commission of certain members meeting at least once a month, and votes the annual budget and deals with questions of local taxation and departmental properties. The council of the *arrondissements* also deal with assessments of taxation and related subjects.

#### The National Legislature

The national government is carried on by a president, a senate, and a chamber of deputies. There are 314 senators, mostly representing departments, who cannot be elected before the age of 40. Their term of office is nine years; every third year one-third of their number retires, and elections are made by a body composed of the deputies, the departmental councillors, the *arrondissement* councillors, and representatives of the municipal councils. The interest taken in the senate is not very great; it is the chamber of deputies which attracts and holds popular attention, which makes and overthrows ministries, and which decides home and foreign policy. In 1914 there were 602 members; there have since been added 22 representatives of the recovered territories, Alsace and Lorraine.

All French subjects over 21 can vote at parliamentary elections, after six months' residence in an electoral district. No one can be elected under the age of 25. The elections are made by a form of proportional representation, which was adopted in 1919, but has not proved altogether satisfactory. Both deputies and senators are paid 15,000 francs a year and can travel almost free on the rlys., making a small payment for their passes.

The term for which each Chamber of Deputies is elected is four years. Instead of there being two parties, corresponding to Conservatives and Liberals, there are a number of groups. From the form of the hall in which the deputies originally sat the main divisions of the Chamber are known as right, right centre, left centre, left, extreme left, and so on, those who hold advanced opinions having their places on the left of the president and those whose views are moderate or reactionary on his right. Combinations of groups are continually forming and dissolving for the purpose of passing certain measures or driving ministers out of office. Ministries are seldom, therefore, long-lived. Nor are they, as a rule, composed of politicians agreed as to principles or strengthened by party discipline. The aim of a prime minister in forming a cabinet is to include the spokesmen of as many groups as possible and thus to secure the support of their members. There is now no group opposed to the republican form of government. A few supporters of the monarchy or the empire may be elected, but have little immediate influence.

#### Powers of the President

With the idea of preventing their presidents from exercising real power and so being tempted to make themselves tyrants, the French have made the office of first citizen almost entirely ornamental. The president of the republic is elected for seven years. The electors are the senators and deputies. They meet for the elections at Versailles. The president can do nothing on his own authority. Every decision he takes must be countersigned by a minister before it is put into operation. War cannot be declared without the consent of both Senate and Chamber, which bodies must also approve of treaties with foreign powers. The president has theoretically the choice of ministers, but in practice the Chamber dictates to him as to who shall be asked to form cabinets, and whoever is asked to do so selects his colleagues. The president receives £40,000 a year, half of which is allowed for the expenses of keeping up the office. Another institution is the Conseil d'État (council of state), a body of high officials and experts who assist in the details of administration.

#### Legal System

The legal system separates civil from criminal jurisdiction. Crimes are dealt with by *juges de paix* (justices of the peace) and police-courts; by correctional tribunals



France. Map indicating the areas devoted to the principal industries and occupations

which try persons charged with more serious offences; by the court of assizes, and by the courts of appeal and cassation. Before an accused person is brought before the three judges who comprise a correctional tribunal, the case is inquired into by a *juge d'instruction* (examining magistrate). This official does all he can to induce the prisoner to admit guilt.

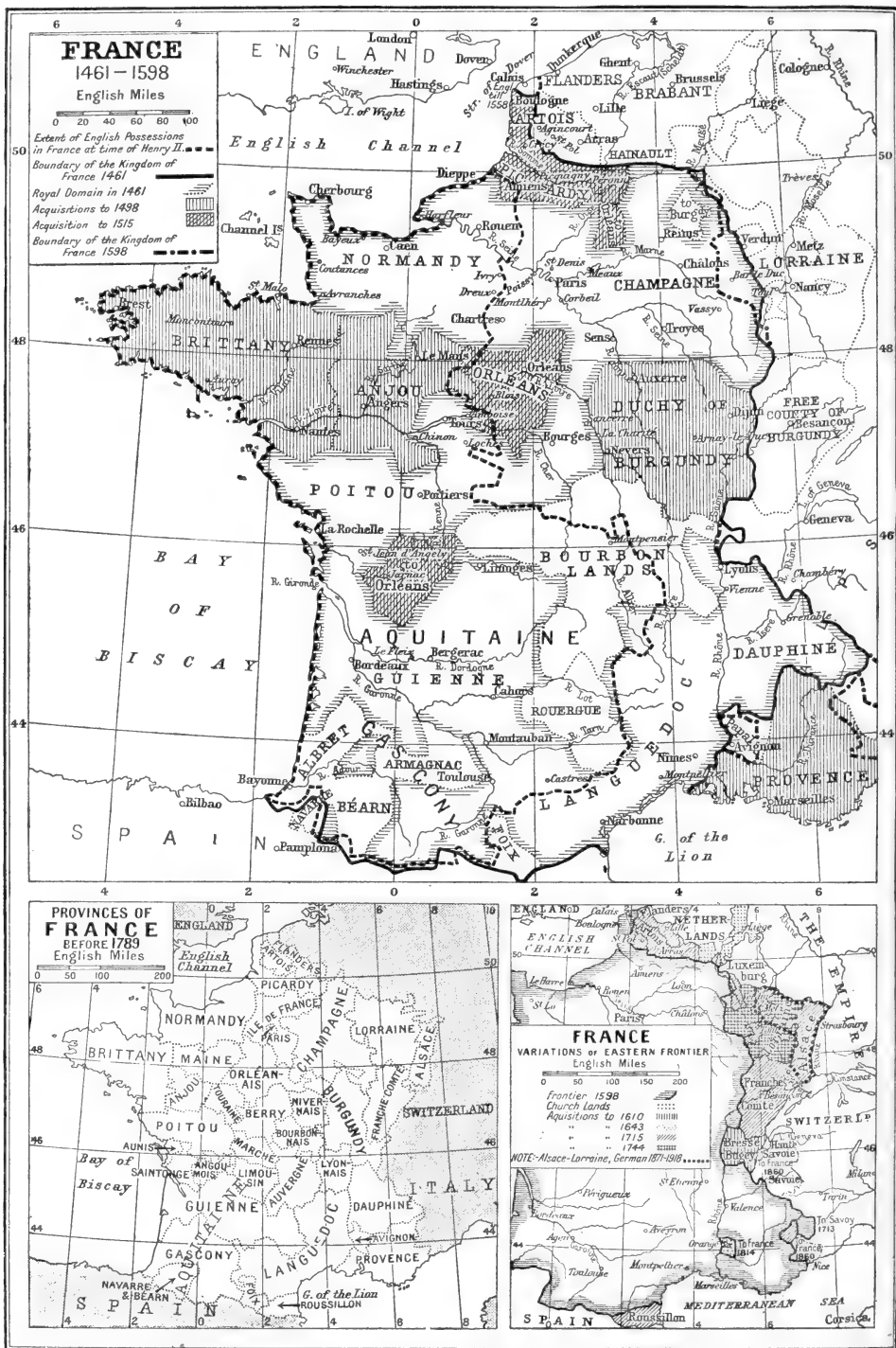
#### Presumption of Guilt

The *juge d'instruction* has power to order the release of a prisoner if there does not seem to him to be evidence enough to support a charge. In the court of assizes prisoners are tried before juries of 12, which convict or acquit by a majority. The court of cassation revises cases which have been tried by juries and deals only with points of law. The courts of appeal rehear cases in which juries have not pronounced upon the evidence, and in which appeal may be lodged, on the ground that the decision of judges were not in accordance with the facts.

Civil cases, if the sums involved are small, come before *arrondissement* courts; tribunals of commerce, or courts of *prud'hommes* (experts) also deal with commercial disputes. The courts of cassation and appeal are also open to civil suitors. Speeches designed to affect the emotions of jurors, and even judges, are not uncommon. It is usual for the judges to side against accused persons and do their best

to obtain convictions, for French law presumes the guilt of anyone in the dock until he can prove his innocence. Women are allowed to plead. All courts and prisons are in charge of the minister of justice. Those who are serving one year and less occupy departmental prisons. Those sentenced to hard labour, and habitual offenders are sent to the penal settlements—New Caledonia and Guiana, or sometimes to the Devil's Island.

**RELIGION AND EDUCATION.** There is in France no established religion. It is a Roman Catholic country, and by far the greater number of its inhabitants profess that faith. Since 1905 church and state have been separated. Actually the changes made by the law of separation were not very great. Churches were allowed to be taken over by the ecclesiastical authorities, pensions were granted to priests with a certain length of service. Mass continued to be performed as usual, congregations were as large as before. The separation had a visible effect, however, upon the religious orders and communities (friars, monks and nuns). It was required of all these that they should apply for legal authority to exist. Some would not apply, others applied and were refused. Of the 30,000 men and 130,000 women who were under vows a large number left France; many had their establishments broken up.



FRANCE: MAPS ILLUSTRATIVE OF THE HISTORICAL DEVELOPMENT OF THE COUNTRY

In the state elementary schools, the teachers must not be priests, monks, or nuns. These schools are free, and children between 6 and 13 are compelled to attend them or others. For boys and girls over 13 there are state *lycées* and high schools provided by communes, as well as private establishments. Then there are a number of state universities, a number of technical colleges, schools of fine arts, and *conservatoires* of music and drama, all state institutions. The numerous technical schools do much to keep up the high standards of French workmanship. There is a good system of training teachers.

#### Training of School Teachers

Free instruction with board and lodging are provided in what are called normal schools; no post can be obtained without a certificate from one of these, and all who obtain posts undertake to remain teachers for 10 years. If they devote all their lives to teaching, they retire on pensions. Salaries are paid to them according to proficiency in their profession, not according to whether they are in populous or small places. Their proficiency is decided by the inspectors of schools. These inspectors are also trained so that they may understand thoroughly the responsibilities of their position. French education, as far as it goes, is good. It helps to keep up the standard of intelligence among what has been called the most intelligent population in the world. Much is done also in the home. French children are encouraged to ask questions, to raise objections, to use their intellects. They are treated as reasoning creatures.

The state does much for the sick and poor, though it does not acknowledge any obligation to provide relief. There is an old-age pension system upon contributory lines. Special care is taken of children who are abandoned or ill-treated. These are mostly placed with peasant foster-parents, and when they are of an age to begin work are given the opportunity, by apprenticeship or technical training, to enter a trade. Lunatics are well looked after at the expense of public funds. There is also widespread organization of charity through the *bureaux de bienfaisance* (alms-giving committees), which exist in all large communes under the presidency of the mayors. The funds at their disposal come partly from private sources, partly from taxes upon entertainments and special grants. Outdoor relief is given, hospitals are kept up, and medical attendance is provided for the sick in their

homes. The idea has grown in the French mind that it is right and proper for the state and other authorities to look after those who need the community's help. The idea of dependence upon the authorities, and of liability to serve the general interest, is noticeable in many directions.

Thus there has never been any objection raised to military service as an obligation upon all men. Liability to this service begins at 20 and does not end until 48. Before 1913 the term spent with the active army was two years, then it was raised to three. In Dec., 1920, it was reduced to eighteen months. From 23-34 the Frenchman belongs to the reserve, then for seven years he is in the territorial army; his last seven years of service he passes in the territorial reserve. Twice during his reserve period he may be called upon for a month's training in camp or barracks; once while he is a territorial he is liable to a fortnight's resumption of soldiering.

#### Military Traditions

Since the period of Napoleon the French have prided themselves upon being a military race, and have been easily moved by the prospect of *la gloire*. They have never had in their army, however, anything approaching either the caste system or the brutal Prussian methods of training. French officers are drawn from the middle as well as from the upper class. There is no gulf fixed between them and their men; indeed, it often happens that a private is a very rich man, a scholar, or a man of famous lineage, while his officer is none of these things. The system of universal service gave the country a force in the field of 3,781,000 men with 92,000 officers, a fortnight after the declaration of war in 1914. In the last year of war it had risen to 5,000,000 men and 128,000 officers.

Universal service applies also to the navy, but there is also voluntary enlistment. Those who are obliged to serve are the men of the seafaring class between 18 and 50. The French navy has suffered much from the faulty management of politicians, but it showed in the war that it had overcome this handicap, and its work in the Mediterranean was excellent.

The finance of France, like that of most other nations, was metamorphosed by the war. Even before 1914 the public debt was considered very large, amounting to between 13 and 14 hundred millions of pounds. In 1920 it had swollen to the immense figure of 9,500 millions, and the payment of interest abroad was made all the

more burdensome by the fall in the exchange value of the franc. The system of raising revenue has always made the indirect taxes large in proportion to the direct. The ratio was usually about four to one. Sugar, wines and other liquors, salt, candles, vinegar were all subject to duty by the excise; railway tickets were taxed before the war, and the high cost of tobacco and matches, due to the state monopoly of these articles, was really a tax. The proposal to establish an income-tax has always been opposed, and even in the urgent need of revenue which followed the war no really severe demand was made for direct contributions. For a time it was hoped that enough would be extracted by way of indemnity from the Germans. As that hope faded the prospect of an unavoidable recourse to income-tax or capital levy faced each minister of finance in turn, but each in turn refused to look at it.

France was a very rich country before the war, and still has vast reserves of wealth, both existing and possible of development. Owing to the saving instincts of the mass of the population it was able to lend money on a vast scale abroad. For many years France stood next to Britain as a holder of foreign investments, and these two countries were easily ahead of all the rest. The difference between them was that, while the British investments were the property of a small number of well-to-do people, the French holdings were spread over a large part of the nation. Special opportunities were offered to the small investor.

#### The Small Investor

He could buy small quantities of loan scrip at shops which sold it for cash across the counter. Investment thus became a regular weekly or monthly habit with large numbers of people earning small incomes. As a consequence of the support given by the French capital to all kinds of foreign and home enterprises, Paris became an important centre of finance. The big French banks, the *Crédit Foncier*, the *Crédit Lyonnais*, the *Société Générale*, and others, transacted enormous business.

Speculative finance, however, became at one period a positive canker on the moral health of the nation. The Panama scandals which were brought to light in 1892 showed an ugly phase of the process by which many were becoming rich. Even when the offensive growth had been probed and a number of persons tried, there remained an uneasy feeling that all



had not been revealed, and a distrust of politicians who had come badly out of the investigation.

**HISTORY.** Little is known of the Gallic tribes who inhabited the greater part of France before the Romans conquered it in the 1st century A.D. They were Celts who came, it is conjectured, from the Danubian plains in the 6th century B.C. Tall, red-haired, with blue eyes and fair complexions, they drove the earlier, darker inhabitants before them and dwelt in loosely organized communities, mostly under chieftains.

#### The Influence of Rome

Caesar, who gives an account of them in his Gallic War, managed to bring them under the authority of the Roman empire. For several centuries the French were proud to belong to that empire, and Rome showed that they interested her by planting among them the elements of her civilization. In those centuries the character of the race was fixed. Although not Latin by descent, it became Latin by adoption. The Roman love of military prowess, the hard Roman tone of authority used by officials, the preference for the concrete and for prose over abstractions and poetry, were all absorbed by the French mind.

During the decline and fall of the Roman empire France suffered in common with all its provinces. It was almost a relief when something like stable government was established by the chiefs of a tribe from Germany known as the Franks. This marks the introduction of the name which replaced Gaul. These Franks founded the Merovingian dynasty, called after a certain Merovech (Merwig), which lasted until half-way through the 8th century. Almost from the first the Merovingians fought among themselves, considered the country as their private estate, and fell into subjection to the powerful officials known as mayors of the palace.

In course of time the kings became mere figures of ceremony, and eventually a mayor of the palace became himself king. His name was Pepin, and his family was called Carolingian because it was founded by his father, Charles Martel or Charles the Hammer, a man of vigorous personality who ruled for years in the name of shadowy monarchs seldom even seen. The grandson of Charles Martel inherited his genius and surpassed his exploits. His name was Charlemagne, and he succeeded in bringing almost the whole of Europe under his rule. He strove to fit himself for the

exercise of his vast responsibilities by submitting himself to teachers long after he had reached man's estate. He kept on good terms with the Church, and when he determined to declare himself emperor was solemnly crowned by the pope in S. Peter's at Rome. Thus he revived the empire of the West, which had been crushed by the barbarian invaders after the setting up at Constantinople of an empire of the East, and this empire survived nominally in a truncated and decrepit form until the Great War swept away the Hapsburgs and the last remains of Charlemagne's dominion.

After his death there followed the same family feuds which had ruined the Merovingians. For nearly 200 years what passes for the history of France is a monotonous record of struggles between men greedy for power. Then the descendants of Charles Martel disappeared, and the Capet family came upon the scene. By this time France had fallen under the feudal system, which soon took root in England also. The conquest of England by William, duke of Normandy, a rival prince to the kings of France, brought England and France into a conflict which continued on and off for 700 years. The kings of England, being foreigners, and having interests in France no less dear to them than their English possessions, were frequently moved to defend those interests, or to encroach upon those of French rulers. The throne had little territory or power. The country was parcelled out among small feudal chieftains, despotic, and actively jealous of each other.

#### S. Louis and the Crusades

With these independent rivals the kings of France struggled, until at the beginning of the 13th century Philip Augustus managed, partly by force, partly by skilful negotiation, to bring the whole country under his sovereignty. His son, Louis IX (S. Louis), tried to do for Europe what his father had done for France. He was an idealist whose mind was set upon a crusade to free the Holy Sepulchre from the infidels; he dreamed of seeing all the monarchs and their peoples unite for this sacred end. Under his successor many circumstances were brought to light which helped to explain the Crusades, and the real object with which they were undertaken. The Order of Knights Templars had taken a prominent part in the Crusades. It had grown immensely rich. It lent money to the crusaders and profited by the opening up of trade routes, and by pillage from

the Saracens. Philip the Fair set covetous eyes upon the Templars' riches, and induced the Holy Inquisition to enquire into their conduct. The inquiry revealed many startling facts not known by King Louis and the enthusiastic believers in the Crusades.

Early in the 14th century the last of the direct male Capets died, and a younger branch of the family, the Valois, took up the burden of rule. War broke out in 1337 between Edward III of England and Philip VI of France. Edward thought he was being cheated of his right to the French throne, and used this as a pretext for the war, which was really caused by the rival trade interests of France and England in Flanders. For a long time the tide of success ran strongly in Edward's favour. He marched far into France and gained the day at Crécy. Calais remained in English hands. France lost heavily again at Poitiers, and the king had to surrender to save his life. Power then passed nominally into the hands of the young heir, Charles, the king remaining in captivity until his death. An attempt was being made to put the government upon a more popular basis by limiting the royal authority. The reformers, led by a merchant named Étienne Marcel, frightened the young prince from Paris. But they had no constructive programme, and, lacking the support of the nobles, they failed, and the chance of reforms, which might have made unnecessary the Revolution of four centuries later, slipped away.

In the years of peace which followed, no attempts were made to restore prosperity and order; the same struggle for power went on, for the opportunity to rule in the name of another young and feeble boy-king. The country was divided; civil war raged. At the height of the misery and disruption Henry V of England saw his opportunity and renewed the war. At Agincourt he won an easy victory.

#### S. Jeanne d'Arc

The French nobility could offer no serious resistance. From one success the English armies went on to others, and by 1428 they had subdued the greater part of France. At this time the French king was a wretched creature who had no stomach for fighting, no head for affairs. The country seemed destined to remain a dependency of England, and for some time it must have done so had not Jeanne d'Arc appeared and put fresh heart into the French people.

Jeanne, deeply religious by temperament, believed that she

heard voices telling her how to save her country from the English, and restore her king to his throne. She gained access to the authorities, and informed them that she would lead the army, raise the siege of Orleans, and have the king crowned in Reims. What she promised to do she accomplished.

The king was crowned, but when she would have pressed on to Paris the king's counsellors said that compromise was now the best hope for France. The generals were jealous of Jeanne's influence over the soldiers. Time was wasted and intrigues became more complicated, until certain French troops, acting in collusion with the English, captured Jeanne and shamefully sold her to be put to death. The English had counted upon this as likely to benefit them, but from that moment they fared worse and worse. Even the king played a man's part under the guidance of more honourable counsellors. Burgundy, which had been divided from royal France for many years, and had sided with England became reconciled. The French, united at last, drove their enemies off all their territory, except Calais, which remained English for two centuries longer.

#### After the Hundred Years' War

The condition of France at the end of the Hundred Years' War was pitiful. The land had been ravaged by successive invasions and by civil war. The nation, worn out by suffering, had no energy left to resist the increase of the powers of the monarchy, and so another step was taken towards the Revolution. For, while the monarchy under Louis XI did much to unite the French people, yet it set obstacles in the way of their governing themselves, and made the government autocratic.

Under Louis XI the claim of Burgundy to be a separate state was finally defeated. Nicknamed the "universal spider," he stands out in history as a type of cunning, cruel despotism. But he left his country well on the way to become the great power which it was under Louis XIV. More was done to build up royal authority by Francis I. Francis involved the country in wars provoked largely by his ambition and intrigues. Soon there was to be another cause for war, this time civil war, accompanied by assassination and massacre.

The Reformation began in Germany, and its echoes were heard in all lands. At first the demand for the purging of the Church from scandals was made in France, purely in the interest of religion. As time went on, social and eco-

nomic grievances were added to those against the Church, and so the Reformers or Protestants became in France, as in England, a political party. Known as the Huguenots, their leaders were men of high position, such as the prince of Condé and Admiral Coligny. On the other side were the Guises, unprincipled and self-seeking, and Catherine de' Medici, an Italian princess with a passion for power and a genius for unscrupulous diplomacy, who was now queen-mother, ruling in the name of her son. The struggle was really one for the control of the government. Religious toleration had little to do with it. At one moment liberty of conscience and worship was conceded, but soon after that came the appalling crime of the massacre of St. Bartholomew's Day, 1572.

#### Henry of Navarre

At last an end was put to the savage religious wars by Henry IV, king of Navarre, a Bourbon. He was a good soldier and an honest man, who sincerely desired his country's advantage. A Protestant, he saw that the feeling of the people favoured the old Church, so he decided to become a Catholic for the sake of peace. "Paris," he said, with jovial cynicism, "is well worth a Mass." So he went to Mass, but, at the same time, he made an agreement called the Edict of Nantes, which gave the Protestants full freedom to follow and teach their faith, to have their ministers paid out of state funds, and to be admitted to all employments equally with Catholics. Henry and his minister, Sully, tried to restore prosperity to a land terribly damaged by discord and dishonest governors. But all that they did was on the old unsatisfactory lines. All power was kept in the king's hands. Such representative bodies as did exist were weakened and confused. The iniquity of throwing the burden of taxation upon working folk, and letting off the nobility and the official class, was not altered.

After Henry IV died another Italian princess became ruler of the unhappy kingdom. This was Marie de' Medici, the king's second wife, who became regent during the youth of her son. Her chief adviser was the cardinal de Richelieu, who continued to be the minister of Louis XIII until his death in 1642. His methods were disastrous for the people of France. His aim was to make the king's authority supreme, and he believed he could best accomplish this by safeguarding the privileges of the noble and wealthy. He was a man of narrow vision, but he

perfected the autocratic system which Louis XIV inherited and used according to the motto *L'Etat, c'est moi*. It was Richelieu who made the Revolution inevitable. He was followed by another cardinal, Mazarin the Sicilian. The widow of Louis XIII, appointed regent for her son, Louis XIV, was the mistress of the cardinal, and made him the ruling power. So hardly did he drive the people that he provoked rebellion.

#### The Glory of Louis XIV

For four years the wars of the Fronde devastated the country, and sowed bitter seeds of hatred among the population. Their only result was that when Louis XIV took upon himself the ruling power he inherited a method of government which was fated to bring about its own downfall. This king, whose reign, beginning nominally in 1643 (actually about 16 years later), lasted until 1715, has been made to stand out as a commanding figure in history, and, much as historians have exaggerated his force of intellect and personality, it is impossible not to recognize in him a man who would have made a name for himself, no matter what his birth.

Brought up to believe that he was different from all other children, flattered as he grew by those who persuaded him that he was the representative of God upon earth, he lost all sense of reality. He held it to be indisputable that he was infinitely wiser than his subjects, that it was his right to give them laws and their duty to obey. He spent incredible sums upon the palace of Versailles, where he kept up a state never dreamed of by earlier kings. A whole literature of gossip and fiction has grown up round the court of the Grand Monarch. It was an age of splendour on the surface and of misery and corruption beneath. While the formalities of Racine and the satirical comedies of Molière were delighting the well-to-do, while preachers like Bossuet were drawing crowded congregations, while architecture was raising monuments which are still marvelled at, and triumphs of engineering, both civil and military, were being won, the mass of the French people were struggling under the burden of taxation, were being swept off by epidemics due to unhealthy conditions, were the prey of tyranny in its most odious forms.

The aims of Louis were to make himself greater both at home and abroad. For these ends he waged war, maintained spies, and put the royal intendants in a position to dragoon the nation. He renewed

the persecution of the Huguenots, good and useful citizens, and revoked the Edict of Nantes. This reduced Protestantism in France to negligible dimensions and shut her out from the current of invigorating mental atmosphere which was then passing through other lands. In the Cevennes, professors of the reformed faith were exterminated. Even those within the boundaries of the Church who ventured to embrace new doctrines were severely repressed. Thus the Jansenists were made victims of royal vanity and impatience.

#### France and the Netherlands

The wars of Louis were equally due to his defects of character. His most dangerous opponent was the prince of Orange, later William III of England. Louis attempted to crush the government of the United Provinces of the Netherlands which had freed themselves from the dominion of Spain. He hoped to annex them, but he was beaten by the obstinate spirit of the Dutch. The prince of Orange stiffened their resistance at a moment when all seemed lost, and from that time onward he spared no efforts to make Louis regret his attempt to subdue a liberty-loving race. Turenne was a general of ability, Vauban a master of fortification, but the obstinacy of William and the genius of Marlborough brought disaster on the French armies, and, after William's death, the pride of Louis was humbled by defeats at Ramillies, Oudenarde, and Malplaquet.

The end of this "magnificent" reign was pitiful, yet such as might have been foreseen. The best minds in France saw that the king had brought ruin upon the country. The national finances were worse than ever before. The minister Colbert had done his best to bring them into some kind of order. He tried to give an impetus to industry and to colonial expansion, and he built a navy to defend the new possessions. For a time France seemed to be on the way to become a greater colonial Power than England. In India, Canada, the W. Indies, Louisiana, and W. Africa the French established themselves. But the settlers and the generals commanding the French forces never received full support from home. One by one their greater colonial possessions fell into British hands.

Colbert might possibly have rescued France from her desperate financial sickness if he had been allowed a free hand, but he had to provide continually huge funds for the carrying on of unsuccessful

wars, and he failed completely to improve conditions for the mass of the people. They felt resentment which they were afraid to utter, until the death of the king gave their tongues freedom. Then they openly rejoiced.

The new sovereign, Louis XV, began with everything in his favour so far as popular feeling was concerned. He was no more than a child, and the kingdom was placed under a regent, the duke of Orleans. But from the first all went awry. Cardinal Fleury, who became chief minister, brought France low through unsuccessful wars. The finances showed no improvement. At one time it was hoped to restore them by adopting the scheme of a Scottish banker named John Law, who blew the Mississippi Bubble. After an orgy of wild speculation, he failed ignominiously, and left things more disordered than he found them. Louis XV was weak both in character and in intellect. He caused scandals by his love affairs, which smirched royalty in the eyes of the nation. His most notorious mistress was Madame de Pompadour, who governed him in everything.

#### Decadence of the Court

The result was catastrophic. Abroad France became more and more contemptible. At home there was distress and even famine. Yet the court and the fashionable world kept up a round of pleasure, poured out the money wrung from tenants and taxpayers, and danced to the tune of "After us the Deluge." Under the sway of Madame du Barry the king fell into even worse ways. The consequence was that when he died the same feeling of relief was experienced as on the death of Louis XIV.

There was hope that the new king would do better. Hopefulness was the keynote to the philosophy of the age, and in that age philosophy was the common reading of all educated men and women. The philosophers, Rousseau, Voltaire, Diderot, and the contributors to the great *Encyclopédie*, which was put together during the 18th century with the object of making knowledge supreme over superstition, wrote in a popular style. They saw that France was in a sad plight, but they held out the hope that all could soon be improved upon by "a return to Nature." There was little writing which could be called revolutionary in the political sense, yet all that was written of a serious kind prepared the way for revolution. A new spirit of human brotherhood, a fresh desire for simplicity and fair dealing, a readiness to consider

great changes as inevitable and desirable, were found in the most unlikely quarters.

The young Louis XVI and his queen, Marie Antoinette, began their reign under favourable omens, at any rate on the surface. The king was an ignorant, well-meaning, self-indulgent young fellow, who preferred his hobby of lock-making to looking into state business. The queen was an attractive, high-spirited young woman, devoting herself, body and soul, to the pleasures of an extravagant and licentious society; she was inexperienced, injudicious, ill-advised. But no one told them that they were in the utmost danger. Unfortunately, the queen took to advising her weak husband as to his choice of ministers. Her advice was mostly bad, partly because others made her the tool of their private interests. Thus, she was persuaded to take part in overthrowing the one statesman who might have saved the monarchy.

This was Turgot, who saw that more was required than tinkering with finance. He set to work to cut down expenses and introduce social reforms. He proposed to let the people have some share in governing themselves. After he had been dismissed at the bidding of the queen, came Necker, a Swiss banker, who pleased nobody, and after him the queen secured the appointment of Calonne, whose imbecile methods made it impossible for the king to carry on any longer. He was compelled, now, to ask for guidance from a body known as the Assembly of Notables, the so-called parliament, which for a short time exercised more power than the monarch. But its place was quickly taken by the States-General, a representative body of national institution, elected by the nation, which met after a long period of inaction on May 5, 1789.

#### The States-General, 1789

The three estates of the realm were the king, the privileged classes, and the people. Very soon the Third Estate claimed to act as the nation, and demanded that henceforth no taxes should be imposed without their consent. This brought them into conflict with the monarchy, and on July 14 the Revolution began by the taking of the Bastille by an enthusiastic, mostly unarmed crowd.

At once there followed outbreaks of violence all over the country. The peasants, infuriated by heavy taxation and by their liability to be forced to work for the benefit of the indolent and luxurious rich, attacked the houses of the aristocracy, refused to pay

further taxes, and seized the land. There was still, however, no attempt to upset the monarchy. So long as the king agreed to the decisions of the States-General he was acclaimed as a "patriot." The power was exercised by the middle class, which had been captivated by the doctrines of the philosophers, but did not consider that any violent change of system was necessary. The people were not so patient. As they learned more about the state of the kingdom, and as they felt their power, they became resolved that they would not be deceived again. The king, they said, must be in Paris. At Versailles there were military plotters against the Revolution. So they brought the royal family by force to Paris, and the States-General went to the capital also, and the first act closed.

In the next act the chief of the new performers was Mirabeau, an aristocrat who threw in his lot with the people, yet aimed at saving the monarchy. If Mirabeau had lived he might have saved France. After his death the voices which controlled the new Legislative Assembly were those of Danton, Robespierre, and Marat. All three belonged to the middle class, and were men of ability, but failed because they could not dominate the passions of the Paris mob. At last the mob broke into the Tuilleries palace, carried off the king and his family, and put them in prison.

#### The National Convention

In the third phase the National Convention comes into being and, more important, the National Army, which was to sweep away the Revolution altogether for a time and make Napoleon supreme. This army was raised as a reply to the threat that the other kings and emperors of Europe would avenge their brother, Louis XVI, who had been executed in January, 1793. Another consequence of this interference was the Reign of Terror. Everyone suspected everyone else of plotting against the Revolution. Upon flimsy pretexts men and women were arrested and guillotined. The Terror affected those who carried on the butchery not less than those who were its victims. The leaders were ambitious, and, jealous of each other, struck wildly at any who stood in their way. Yet amid all the horrors and uproar there went on the work of creating a new machine of government. Officials sat in their rooms day after day disregarding the turmoil and the bloodshed. The life of the country went on. The new army went on from triumph to triumph.

Gradually from these victories arose the star of Bonaparte. He had impressed the order-loving elements by his "whiff of grape-shot" which ended a rising in 1795. Then followed his Italian victories. In 1799 Bonaparte overthrew the Directorate, proclaimed himself First Consul (there were three, but the other two were shadows), and began his vigorous and in many ways admirable rule. It was so productive of results that in 1804 he became emperor. From now on he governed not less despotically than Louis XIV, and by much the same methods, such as a widespread spy system and the crushing of all ideas which did not suit him.

#### The Genius of Napoleon

Yet there was one immense difference between Napoleon and Louis XIV: he was a man of exceptional ability. His mind was capable of vast and beneficent conceptions, and he could think out his plans with accuracy and harmony down to small details. He had the knack of enforcing men to enjoy obeying him, to sacrifice themselves for him willingly. All this increased his vanity, took away his sense of proportion, shook the balance of his reason, brought him to ruin in the end. He was not great as a man, for his human qualities were conditioned by his colossal selfishness; but he possessed a great capacity, an intellect of the rarest temper and usefulness, a personality which has never been surpassed in its power to influence the world's imagination and create that legend which alone can secure popular support. Partly because he was an ambitious soldier, partly because the other sovereigns resented his appearance among them, he was perpetually occupied in making war.

Combinations were formed against him time after time, yet his power still increased. His invasion of Russia in 1812, however, led to disaster, and encouraged all the Great Powers to combine against him. His armies retreated further and further; one after another the territories he had conquered had to be given up. In March, 1814, Paris was taken by the Allies, and the emperor resigned the throne. Sent to Elba, he refused to accept defeat. The old monarchy had been restored, Louis XVIII was king, but as soon as Napoleon returned to France there was a hurried flight of royalty and the emperor was once more at the head of affairs. But at Waterloo his strength was broken. The restored monarchy lasted 15 years. Then it was swept away by a Republican rising, which did not, how-

ever, result in a restored Republic. The opportunity was seized to put on the throne Louis Philippe, a prince of the Orleans branch of the reigning family, who kept his uneasy seat for 18 years and was driven out to make room for the Second Republic in the year of revolutions, 1848. The first president of the new republic was the holder of the great name of Napoleon, a nephew of the emperor, a man of small capacity, but of unbounded faith in himself. He had lived in England as an exile. He had been imprisoned in France for a theatrical violation of the law excluding him from the country. Now he was elected president by an immense majority, which was repeated in 1851, when he seized supreme power and prepared the way for his "acceptance" of the title of emperor at the end of 1852. Once again the French people were under the domination of a tyranny. All institutions which aimed at keeping alive the spirit of freedom were suppressed. No criticism upon the doings of the government was permitted. Yet on the whole the nation was not dissatisfied. There was material prosperity to console it for the loss of liberty, if indeed liberty had ever really been either its possession or its desire. The second of the "great exhibitions" held in Paris in 1855 seemed to most observers to be evidence that the country was contented as well as prosperous, and that the revival of the Empire was likely to endure.

#### The Wars of Napoleon III

It has been said of Louis Napoleon that he spoke of its endurance as contingent upon "a war every four years." Whether he used the words or not, he skilfully carried out the policy they suggest. He drew England into the Crimean War for the defence of the Turkish Empire; he fought Austria for the supposed purpose of liberating Italy; he sent an expedition to Mexico to bolster up an empire there. Finally, he was foolish enough to try to humiliate Prussia, and so gave Bismarck the opportunity he wanted for war with France and for consolidating the German Empire.

Bismarck was only too glad to take up the challenge rashly thrown down, and France alone had to face the armies of Prussia, Bavaria, Saxony, and Württemberg. Europe looked in amazement while the Germans gained victory after victory, and in the early autumn, with the emperor a prisoner in their hands, encamped round Paris. The siege was gallantly endured, but at the close of

Jan., 1871, the city capitulated, and peace was made. France surrendered Alsace and part of Lorraine, and paid an indemnity of £200,000,000.

France, however, recovered quickly, after the bloody episode of the Paris Commune. The republican form of government was tried for the third time, and to that form the country has remained constant ever since. Yet it was not for many years that the Third Republic could be considered stable. The monarchist party kept up unceasing efforts to upset it. Fortunately the royal pretenders to the throne which had been abolished were such poor creatures that they were never able to gain a serious following.

In France the Republic was accepted not so much because it was liked as because it seemed to offer the best hope of internal quiet. Under it the nation worked hard, paid off the indemnity much sooner than was expected, and reached a higher degree of general well-being than it had ever reached before. Political strife was unceasing and fierce, but the mass of people paid small attention to it. So long as they could go about their business with confidence, and so long as there was no danger of France being embroiled in foolish foreign adventures, they let the politicians talk.

#### Boulanger and Dreyfus

The moment of greatest danger through which the Republic has passed occurred in 1889, when General Boulanger reached the pinnacle of his curious, meteoric career. If Boulanger had been anything more than a popularity-hunter, he might have caused a revolution. But when it was rumoured that the government intended to order his arrest, he fled.

A decade later France was again divided into two camps by the case of Alfred Dreyfus (*q.v.*). In the end Dreyfus was pardoned and Esterhazy, the wretched creature who was proved to be the forger of the evidence against Dreyfus, became the object of popular detestation in his place.

For all these years the affair had coloured politics, and its result was to weaken once more the parties of intolerance and reaction. That there was still life left in them, however, was the belief of those who resolved early in the century upon the separation of Church and State, and the suppression of the religious orders. All who held anti-clerical opinions maintained that Clericalism had been strongly against the innocent Dreyfus. The politicians who were taking turns at holding office saw that a favourable opportunity had come for

weakening the influence of the Church. There was much agitation against the new laws, and some disturbances. There was, however, no general protest, which was taken to show that the Church had no great hold upon the Frenchman of the twentieth century. At the same time there were many young men of sincere religious conviction in the forefront of the forward movement which began to be noticeable within politics and literature about 1911. This had for one of its objects the freeing of France from the pin-pricks of Germany. When Germany set about putting itself into a state of greater readiness for war, the reply of France was to increase the term of military service from two years to three.

For a long time there had been an alliance between republican France and the Russian autocracy. The tsar had borrowed enormously from the thrifty French peasants, and had undertaken in return that France should not again be isolated as in 1870.

For some years also Britain had encouraged the Dual Alliance to look to her for support if it should be attacked. Yet when the attack came in 1914 the French people showed no enthusiasm for war; they did not trust their politicians; they did not feel at all sure how things would go. Until the first battle of the Marne their uneasiness grew. After this they stiffened into that solidity of resistance which carried them through the long ordeal of Verdun. During the later stages they were less troubled by misgivings because they had put into power a man who ruled energetically and made them feel that all was going well. This man was Clemenceau. Amid the throng of doubters and dissemblers which filled the political stage the figure of the aged "Tiger" caught the popular imagination. He came into power as leader, not of a party, but of the nation.

#### Influence of Clemenceau

Clemenceau was a world celebrity during 1918-19. His influence was stronger than that of any other statesman in moulding the conditions of peace. So secure did his position seem that it was considered almost certain he would be elected president of the Republic in January, 1920, but the choice fell on a man of much less vigorous personality, and Clemenceau retired. The arrangement made by Clemenceau for an alliance between France, Britain, and the U.S.A. (in spite of the clause forbidding such alliances in the League of Nations Covenant) broke down when the U.S.A. washed its hands of European re-

sponsibility. This completed the circle of change in French feelings towards the American people.

When in 1917 the Americans declared war, the French recovered suddenly from a fit of severe depression, and for a while extolled them to the skies. By degrees this admiration altered to coldness, and at last to positive dislike. Indeed, the period which followed the end of the war saw France in a dissatisfied, uncomfortable frame of mind. The terms of peace had been made as severe almost as her leaders wished, yet the result was not what had been anticipated. The French are by nature more sceptical than the English; they had not, therefore, expected quite so much in the way of "a new heaven and a new earth." Yet there had been signs of a new idealism, of new spiritual horizons. Disillusion was felt there as elsewhere. When President Wilson declared that the government was controlled by "militarists" there was a loud outcry, but under their breath a good many French people were saying the same thing.

#### After the Great War

The mass of Frenchmen approved the effort of their government to crush Germany. When the president, Deschanel, was forced by bad health to resign, the premier, Millerand, was elected in Sept., 1920. The Leygues government resigned, Jan. 12, 1921, and A. Briand became premier, but was forced to resign in Jan., 1922, owing to the unpopularity of his foreign policy. A new ministry was formed by R. Poincaré, under whom an intensive policy of pressure on Germany was undertaken, culminating in the French occupation of the Ruhr. The question of German reparations was the chief pre-occupation of French politics from 1922-24. See Germany; Reparations; Ruhr.

Hamilton Fyfe

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LANGUAGE AND LITERATURE. One of the Romance family of languages, French had its origin in the popular Latin (*sermo plebeius* or *rusticus*) spoken by the Roman soldiers, merchants, and colonists in Gaul. Scarcely affected by Celtic influences, this popular Latin tongue, one distinguishing feature of which was the substitution of analytical forms for the elaborate case and verbal inflections of literary Latin, had already established itself by the end of the first century of the Christian era.

As they amalgamated with the Gallo-Roman people, the Frankish conquerors adopted it in their turn, adding to its vocabulary a small infusion of words chiefly of political or military significance, e.g. *vassal*, *fief*, *haubert* (*halsberc*), *heavme* (*helm*), *guerre* (*uerra*), but contributing little to its phonetic or syntactical development. By the 7th century this *lingua romana rustica*, spoken by all classes and accepted by the Church, though not yet committed to writing, had passed into a form which can be recognized as embryonic French.

The character of this transitional tongue may be judged from the first important monument of it, the Strasbourg Oath, by which, in 842, Louis the German entered into alliance with his brother Charles the Bald: Pro Deo amur et pro christian poble et nostro commun saluament, d'ist di en avant, in quant Deus savir et podir me dunat, et salvarai eo cist meon fradre Karlo, et in adjuha et in cadhuna cosa, si cum on per dreit son fradra salvar dift, in o quid il mi altresi fazet. In modern French this is: Pour l'amour de Dieu et pour le salut du peuple chrétien et notre commun salut, de ce jour en avant, autant que Dieu me donne savoir et pouvoir, je soutiendrai mon frère Charles et en aide et en chaque chose, ainsi qu'on doit, selon la justice, soutenir son frère, à condition qu'il m'en fasse autant.

#### Langue d'Oc and Langue d'Oïl

But though now the common language of the country, the prevailing feudal confusion was fatal to its uniform development, and for a time it was broken up into a number of independent dialects. The principal division was into the *langue d'oc* of the south, which approximated to the Italian and Spanish modifications of the Romance stock, and the *langue d'oïl* of the north, the parent of modern French; but in the *langue d'oïl* itself there were four well-marked varieties—those of Normandy, Picardy, Burgundy, and

the Ile de France. But the election to the monarchy of Hugh Capet, duke of France, in 987, made Paris the capital of the kingdom and gave the dialect of the Ile de France, or French as it was specifically called, an enormous advantage over its rivals, and with the steady political unification of the country from the 12th century onward this gradually became the official language of the entire people. The other dialects of the north, and later the *langue d'oc* or provençal, sank into the condition of mere patois. It was not, however, till the 15th century that the triumph of the French tongue was complete and its stability and uniformity definitely assured. By this time the case-endings and other synthetic features of the *lingua romana*, which had lingered in Old and Middle French, had entirely disappeared.

#### Evolution from Latin

Philology has established the fact that the evolution of French out of Latin was governed by certain fundamental laws, of which the most important are: (1) the persistence of the Latin tonic accent; thus *amāre* became *aimer*, *pōrticus*, *pōrche*; (2) the contraction or loss of the Latin termination, as in the examples just given; (3) the disappearance of the short vowel immediately preceding the stressed syllable; e.g. *bonitatem* = *bonté*, *claritatem* = *clarté*, *septimana* = *semaine*; (4) the suppression of the medial consonant: e.g. *maturus* = *maurus* = *mûr*, *confidentia* = *confiance*. These morphological rules, however, apply only to the natural and spontaneous evolution of the language and lapse entirely in respect of that large portion of the modern vocabulary which consists of words afterward imported from the Latin by scholars and writers (*mots savants*). Hence we can at once decide in the case of the many existing doublets, or words slightly differing in form though ultimately derived from the same sources, e.g. *hôtel* and *hôpital*, *confiance* and *confidence*, *lier* and *liquer*, which belong to the primitive and popular foundations of the language and which are of later and artificial origin.

LITERATURE. Though a few religious poems of earlier date have come down to us, French literature really begins with the epic poetry of the 11th, 12th, and 13th centuries. This poetry, which is full of the chivalrous spirit and is essentially aristocratic in character, falls roughly into two divisions: the *chansons de geste* and the *romans épiques*. Of the former,

largely concerned with the fabulous exploits of Charlemagne and his paladins, the most famous example is the *Chanson de Roland*, dating from the second half of the 11th century. Such chansons are supposed to rest upon slight historical bases; the *romans épiques* were legend or fiction.

#### The Arthurian Cycle

Most of these belong to the Celtic legend-cycle of Arthur and the Round Table, e.g. the poems of Chrétien de Troyes, of the second half of the 12th century. Others deal, albeit in a most extravagant way, with classical antiquity (*romans antiques*): e.g. the *Roman d'Alexandre* of the 12th century, which is specially interesting because it introduced the twelve-syllable verse, later the standard measure of French poetry and hence called the alexandrine.

After this epic poetry the most important branch of medieval French literature is the allegorical-didactic poetry which reached its culmination in the *Roman de la Rose*, the first part of which, written c. 1237 by Guillaume de Lorris, contains a courtly "art of love"; while the second, written by Jean de Meung, some forty years later, with its bold satire upon contemporary society, illustrates the rising reaction of the practical bourgeois spirit against the fantastic idealism of the aristocratic classes. This reaction further appears in the *fabliaux*, or short humorous stories in verse, of the 13th and 14th centuries, but its fullest expression is to be found in the *Roman du Renard* (12-14th centuries), which is indeed a kind of anti-romance or burlesque of the fashionable *chansons de geste*.

Although in the N. narrative and didactic poetry flourished most, lyrical verse was cultivated in the S., notably by the Provençal troubadours, who sang of courtly love in elaborate and intricate stanza-forms; but as the old chivalrous sentiments waned the poetry of the latter became increasingly vapid and unreal. The note of sincerity was however, struck by Rutebeul (d. c. 1280) and 200 years later by the great François Villon. Concurrently the drama, which in origin was the offspring of the liturgy of the Church, evolved through *miracle*, *mystère* and *moralité* into two popular forms of serious play—the *sottie*, a short satiric piece resembling the *moralité* in its allegorical machinery and didactic intention, and the *farce*, which may be broadly defined as dramatized *fabliau*. Meanwhile prose developed slowly, and it was not until the 13th century

that with Villehardouin's *Conquête de Constantinople* it began to displace Latin in the writing of history. Of the many other chroniclers of the Middle Ages three are particularly noteworthy: Joinville with his *Histoire de St. Louis*, written 1305-9; Froissart with his *Chroniques*, written c. 1373-1400; and Commines with his *Memoires*, written c. 1488-1500. Prose was also employed for fiction, as by Antoine de la Salle. The exquisite *chanteable*, Aucassin et Nicolette, of the later 12th century, is an interesting connecting link between the verse and the prose *roman*.

#### Renaissance Influence

In the 16th century French literature, thus far thoroughly medieval in character, was transformed by all the liberalising influences of the Renaissance and especially by the revived study of the literatures of Greco-Roman antiquity, to which the new writers turned for their inspiration and models. In poetry the transition is marked by Marot, and soon after his death the revolution was completed by a group of writers, collectively called *La Pléiade*, whose leading spirit was Ronsard. The manifesto of this brotherhood is contained in *La Defense et Illustration de la Langue Francoyse* (1549), the author of which, Du Bellay, advocates the enrichment of French by the free importation of words and idioms from various sources and particularly from the classic tongues. In regard to literature, he insists that the poet should abandon entirely all the older native forms of verse and devote himself to the production of eclogues, epics, elegies, dramas, etc., in the classic style.

Ronsard himself attempted to naturalise some of the "great types" of ancient poetry in his *Odes*, 1550-53, and his unfinished epic, *La Franciade*; and *Pléiade* principles were also adopted by an outsider, the protestant Du Bartas, in his Biblical epics, *Judith* (1573) and *La Semaine* (1578). The dramatic part of the *Pléiade* programme was carried out by Ronsard's young disciple, Etienne Jodelle. His comedy, *Eugène*, 1552, has little historical importance; but in his two tragedies, *Cléopâtre captive* and *Didon se sacrifiant*, he laid the foundations of that Senecan or classic type of tragedy which was to flourish in France for nearly 300 years. His lead was followed by other writers, notably Garnier, while Larivey, influenced by his Italian models, made a significant innovation by the substitution of prose for verse.

Meanwhile prose literature, hitherto little more than experimental, developed rapidly in many directions. Calvin's *Institution de la Religion Chrétienne* (1st French ed. 1541), though in subject-matter interesting only to the theological student, and Amyot's version of Plutarch (1559), though a mere translation, deserve mention among the monuments of the new prose. This was now freely used for biography and history (e.g. Blaise de Montluc's *Commentaires*, written 1570-77), and for political purposes (e.g. La Boétie's *Discours de la Servitude Volontaire*, first printed 1576, and the *Ménippée satire*, 1594, by Pithou, Passerat, and others). But in general literature the two outstanding names are those of Rabelais and Montaigne, both of whom, despite their fundamental differences, are representative exponents of the emancipated spirit of the Renaissance.

With the 17th century we pass into what French historians call *le grand siècle*, during which the consolidation of the power of the crown, begun by Richelieu, was completed by Mazarin and absolute monarchy finally established by Louis XIV. In literature the triumph of classicism was the concomitant and in large measure the result of this culmination in politics of the principles of centralization and autocracy.

#### The Classic Period

Under the influence first of the salons and then of the Academy, founded in 1635, and the court, literature, too, was reduced to law and order; the individualistic tendencies of the 16th century were checked, and general standards of judgement and taste were prescribed; with the result that, while an artificial unity and great brilliancy and polish were attained, they were attained only at the cost of originality and independence. In poetry the classical movement was initiated by Malherbe, who set out to clear the language of the archaisms of the *Pléiade* and the conceits which had more recently been introduced from Italy, and to regulate versification by the severest rules of technique.

But while Malherbe thus laid down the lines which poetry was to follow for the next 200 years, the real master of the classic school was Boileau, whose *L'Art Poétique* (1674) was long accepted as its authoritative text-book. Only a few writers, one the satirist Régnier, were bold enough to resist the new tendencies. But one great poet of the century, the inimitable fabulist La Fontaine,

though claimed by the classicists, occupies a place apart. While under the dictatorship of Malherbe and Boileau pure poetry declined, the drama, on the other hand, flourished in great splendour. After Jodelle and Garnier little progress had been made in tragedy, though the prolific Alexandre Hardy had done something to popularise it; but the classic type now reached perfection in Corneille and Racine, with whom we may also mention the minor writers, Rotrou, Thomas Corneille, and Quinault. At the same time the comedy of manners and social satire, which had slowly been emerging out of the popular farce, assumed its most brilliant form in the work of the greatest comic playwright of the modern world, Molière, among whose numerous followers two—Regnard and Dancourt—have substantial claims to distinction.

In the general prose of the century the foremost names are those of the moralists, La Rochefoucauld, Pascal, and La Bruyère; and of the preachers and religious writers, Bossuet, Bourdaloue, Massillon, and Fénelon. But letter-writing and memoir-writing were also cultivated with great success; the former in particular by the *incomparable épistolaire*, Mme. de Sévigné; the latter, e.g., by the two famous chroniclers, De Retz and Saint-Simon.

To the 17th century also belong the beginnings of the novel. For its first 75 years indeed prose fiction was mainly represented by the prolix and hopelessly unreal pastoral romance, typified in *L'Astrée*, 1610, of Honoré d'Urfé, and by such *romans précieux* as Gomberville's *Polexandre*, 1638-41; La Calprenède's *Cléopâtre*, 1647, and Mlle. de Scudéry's *Grand Cyrus*, 1649-53. But a bourgeois reaction against these fantastic products of the aristocratic salons soon appeared in Charles Sorel's burlesque, *Le Berger Extravagant*, 1627; and in the same writer's earlier *Francion*, 1622; in Scarron's *Roman Comique*, 1651-57; in Furetière's *Roman Bourgeois*, 1666; and in a different way in Mme. de la Fayette's *Princesse de Clèves*, 1678, we mark the emergence of the novel in its modern form.

#### The Eighteenth Century

While not altogether unchallenged, the classic ideal held sway until the death of Louis XIV in 1715. In the period of growing political and intellectual unrest which followed, though the established theories were maintained, the fundamental character of French literature underwent an

entire transformation, to which the popularity of English literature, especially among the bourgeoisie, greatly contributed. In particular, under the influence of the critical and utilitarian tendencies of the age, literature came to be valued less for its aesthetic qualities than as a means for diffusing ideas, and for this reason the representative masterpieces of the century belong rather to the literature of polemical and propagandist purpose than to that of creative imagination. In prose the transition is marked by Bayle, Fontenelle, and Montesquieu. But as early as 1718 the most brilliant exponent of the 18th century spirit, Voltaire, had already opened his long career of prodigious activity and striking success in almost every field. Vast as was his influence, however, it was less profound than that exerted by Rousseau, who passionately attacked all the dominant ideals of his age, and who, in his subjectivity, sentimentalism, and love of nature, may be regarded as the first great precursor of romanticism. After these two the foremost prose writer of the century is Diderot.

Meanwhile, in this uncongenial atmosphere, poetry languished; Voltaire's epic *La Henriade*, 1728; the didactic verse of Louis Racine; the descriptive poems of Saint-Lambert, Roucher, and Delille; and the odes of Jean-Baptiste Rousseau adding little of interest to the possessions of French literature. Some excellent light verse is indeed to be found in the minor poems of Voltaire; in J. B. L. Gresset; and in the *Fables* of Florian; but in its higher forms 18th century poetry had only one acknowledged master, André Chénier, the last great product of the classic school. Tragedy, represented at its best by Crébillon and Voltaire, suffered from a similar dry rot; but comedy, on the other hand, maintained its vitality in the plays of Destouches, Piron, Marivaux, and Beaumarchais.

#### Innovations in Drama

The most significant feature in the history of the 18th century drama is the appearance of a new type of serious play, the *tragédie bourgeoise* or *drame*, in which the conventions of classic tragedy were repudiated and the truth of nature was sought. The way for this had been prepared by Marivaux and by the *comédie larmoyante* of La Chaussée, but its founders were Diderot and Sedaine. This innovation was closely connected with the progress of the democratic movement, the influence of which is also conspicuous in the further

development of the novel in the hands of Le Sage, Marivaux, Prévost, Jean Jacques Rousseau, and Bernardin de Saint-Pierre.

While the Revolution overthrew the old social order, it did not at once destroy its art, and the literature of the revolutionary period represents in the main the final exhaustion of classicism. Two great writers, however—Mme. de Staël and Chateaubriand—herald the romantic movement of the second quarter of the 19th century. Romanticism, defined by Hugo as "liberalism in literature," was at bottom the result of the extension to art of the revolutionary principles of freedom and individuality; whence its rejection of classic convention and all external authority, its assertion of the right of genius to be a law unto itself, its extreme subjectivity, and its frequent extravagances; while the mediocrity, picturesqueness, and emotionalism by which it was also characterised arose from a sweeping reaction against the scepticism and aridity of the 18th century.

The new note in poetry was first clearly struck by Lamartine, but most powerfully by Hugo, the paramount personality of the entire movement. Vigny, Musset, and Gautier were also pre-eminent.

#### The Rise of Romanticism

Moribund classic tragedy was now displaced by a drama of the free romantic or Shakespearean type. Here the real pioneer was Dumas, but its principles were formulated by Victor Hugo in his preface to *Cromwell* (1827), the first great trumpet-call of romanticism, and it was his Hernani (1830) which assured its triumph on the stage. While, however, the glorified melodrama of Dumas had all the qualities which make for popularity, the finest art of the romantic drama must be sought in the plays of Vigny and Musset.

In fiction the historical romance, inaugurated by Vigny and Mérimée, attained enormous success with Hugo, Dumas, and a host of others, and side by side with this appeared the idealistic novel of George Sand in direct line from Rousseau's *Nouvelle Héloïse*, and the realistic novel founded by Balzac and Stendhal. Among the critics, Nisard held tenaciously to classical standards and methods, but the quickening and broadening influences of the time are clearly seen in Villemain and the greatest of all French critics, Sainte-Beuve. The period was also rich in religious and philosophical literature, e.g. Joseph de Maistre, Lamennais, Cousin, and Comte; and in history, e.g. Thierry, Guizot, and Thiers.

By the middle of the 19th century romanticism had spent its force; the pendulum of taste swung in the opposite direction, and in response to new social and intellectual tendencies and the rapid spread of the scientific spirit, literature became for a time predominantly anti-romantic and realistic. The change is shown in the drama by the *comédie de mœurs* (a descendant of the later 18th century drama) of Augier and the younger Dumas; and the *drame naturaliste* of Becque; in fiction by the *roman réaliste* of Flaubert and the brothers Edmond and Jules de Goncourt; and by the *roman naturaliste* of Zola, Fabre, Maupassant, and Daudet.

A few novelists, like Octave Feuillet, opposed the prevailing realism, while others, like C. A. A. Theuriet, were only in part affected by it. Outside fiction, much of the prose of this period belongs to the literature of the particular subjects dealt with rather than to general literature, and need not, therefore, be considered here; but in some cases, as in those of Renan and Taine, even specialised history was by the technical qualities of form and style raised to the highest level of art. Another noteworthy feature of the time was the immense development of criticism by many writers of striking merit, as e.g. Taine, Brunetière, Scherer, Faguet, and Lemaître.

#### Parnassians and Symbolists

Poetry meanwhile passed through several well-defined phases largely associated, in consonance with the systematising habit of the French mind, with recognized schools. Two of Gautier's disciples, Banville and Baudelaire, mark the transition from the ideas of the romantics to those of the *Parnassiens*—Leconte de Lisle, Hérédia, Sully-Prudhomme, and others, who were broadly neo-classic in principle; and these in turn were succeeded by the *Symbolistes*—Mallarmé, Verlaine, and others, in whom may be detected the reawakening of the romantic spirit under fresh forms. Other poets of the time, however, notably Richepin, Moréas, Régner, and Francis Jammes, cannot strictly be connected with either of these special groups. Jammes is one of the younger generation of writers who, carrying forward the movement initiated by Verlaine, have undertaken a fundamental revolution in the prosodial characteristics of French poetry. In the evolution of poetry may be noted the renaissance of the idealistic spirit, and after 1870, though the realists still held their ground, this

became increasingly apparent in other fields of literature; as in the revival of the poetic drama with Bornier, Coppée, and Rostand. Liberated from the cramping theories of pseudo-scientific realism, all French literature indeed has since developed with healthy freedom along many independent lines. In two departments in particular France still keeps her high place: in the drama, as in the plays of Lemaître, Hervieu, Brieux, Donnay, Bataille, and Bernstein; in fiction, as in the novels of Anatole France, Loti, Bourget, Bazin, Prévost, Barrès, Boylesve, and Bordeaux.

**W. H. Hudson**

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ART. It is generally conceded that French art, more than that of any other country, reflects the national aesthetic judgement and feeling. Just as a Frenchman can be identified as such before he begins to speak, so is a French painting or piece of sculpture unmistakable by its particular qualities. For a long time, indeed, in the fine arts at any rate, the national quality overshadowed the personal; and though of late years the cosmopolitan spirit has affected French art like everything else, it is still true that the idiosyncrasies of individual French artists are much less remarkable than their mutual affinities.

#### The Classic Tradition

The outstanding characteristic of French art is its high standard of competence. Nowhere in the world is so high a level of accomplishment reached. On the other hand, the predominant element in that competence is an intellectual one; and this leaves little room for spirituality such as is found in the best Italian work, or for the poetry inherent in a good deal of British art. The intellect of the Frenchman is clear cut, extremely logical, almost untouched by sensuousness, and his art is endowed with precisely parallel qualities.

Hence comes his devotion for classicism. The main stream of French art has always been classic, whatever sporadic manifestations there may have been of other tendencies, romantic, impressionist, expressionist, and so forth. In no phase is the strength of the classic ideal more clearly shown than in architecture. French Gothic certainly had its own character and beauty, but it was a style imposed on France by the religious orders, and fostered by a temporary religious exaltation, rather than the product of the national genius. The great French cathedrals began to be built in the second quarter of the 12th century; but though these still remain as monuments to the period, Gothic, as a building style in France, had exhausted its strength before the end of the 15th century, and was virtually extinct by the middle of the 16th—never to be revived.

#### The French Renaissance

The classic revival, spreading out of Italy, appealed at once to French national aspirations, and, first introduced into the country by Italian workmen, was quickly assimilated by the French builder-architects. This "French Renaissance" was the foundation of the classic style of building that has held the field in France, virtually without interruption, up to the present day, and, lasting from about the reign of Charles VIII (d. 1498) to the end of the 18th century, was an era of splendid accomplishment. The 16th century saw De L'Orme and Jean Bullant at work on the Tuileries, the 17th the building of the Royal Palace at Versailles, and the completion of the Louvre by Lemercier, as well as the career of François Mansart, one of the most individual geniuses of French and world classicism.

If the neo-Renaissance buildings of modern Paris seem paltry compared with the older masterpieces, it is not the less true that French architecture continues to exercise an immense influence on the building of other countries. The tradition of classicism, balance, perfection of form, justness of proportion, persists very palpably in this phase of French artistic expression, and no survey of other phases would be complete without reference to the general principles it so clearly embodies. The same principles reappear in the more permanent examples of French painting and sculpture.

French painting owed its beginnings to Flemish and Italian artists, in the same way as French architecture was indebted to the Italian craftsmen. An attempt has

been made by patriotic French critics to establish the existence of an important national school at Moulins towards the end of the 15th century, and the identity of the "Maître de Moulins," the painter of a well-known triptych at that town, with Jean Perréal, a contemporary artist of French nationality. But apart from the uncertainty surrounding the personality of this Primitive and others, it is difficult to trace any material difference between their work and that of the Flemings of the same time.

Even Jean Fouquet, the illuminator of the Chantilly Book of Hours, is identified with several paintings that are Flemish or German in character, and the School of Tours, in which he was the outstanding figure, seems to have been almost entirely directed by northern masters. In the art of Nicholas Froment, of the School of Avignon, who flourished in the third quarter of the 15th century, Italianate influences manifest themselves as well as those of the Low Countries. Jean Clouet (d. c. 1540) and his son François (d. c. 1572) were Netherlanders domiciled at Tours. Both became court painters and helped to carry on the Flemish manner as opposed to the Italian manner which was then being fostered by Rosso and Primaticcio in the decoration of the royal buildings at Fontainebleau. The most notable "French" artist of the Fontainebleau group was Jean Cousin (d. c. 1584), called "The French Michaelangelo." Modern criticism, however, has dubbed him a mediocre follower of Primaticcio.

#### Poussin and Lorrain

The Fontainebleau decorative school died rapidly, and shortly after the dawn of the 17th century French painting had passed out of the stage of apprenticeship and was evolving on vigorous and characteristic lines of its own. The principal foreign impulse came from Rome. It was there that Nicholas Poussin (d. 1665), the real founder of the classical school of French painting, found his inspiration. Poussin's art, nevertheless, represents the most typical expression of the purely intellectual side of French genius. Based on a definite theory of design and composition, it is coldly classical, wholly unemotional. Even his landscapes testify his devotion to the severely classical ideal, though they also show a genuine, if austere, love of nature. In landscape, however, he was easily surpassed by his great contemporary Claude Lorrain, who, adopting the same classical model in his combinations

of both architectural and landscape elements, clothed his work in light and atmosphere. Ruskin said of him that he effected a revolution in art, which revolution "consisted mainly in setting the sun in the heavens"; and in this respect he was the founder of modern French, and, indeed, of all modern landscape art.

A variant on the severe classicism of Poussin and Lorrain was introduced by Simon Vouet (d. 1649) in the form of a naturalism based on that of Caravaggio; and his pupil Charles Le Brun (d. 1690) succeeded in imposing on French painting a pompous character that checked for a time the growth of independent genius. This was the fruit of the minister Colbert's avowed policy, of which Le Brun was the instrument, of directing French art into industrial and decorative channels; and it was followed, in the 18th century, by a not unwholesome reaction.

#### Chardin, Fragonard, Watteau

Meanwhile, the genre painting of the brothers Le Nain, who flourished in Paris during the first half of the 17th century, had kept alive an older and simpler tradition than the Italian one. They painted the daily life of the people, very much in the manner of contemporary Dutch and Flemish schools, but with a certain southern grace in their realism. In much the same way Jean Siméon Chardin (d. 1779), an isolated figure among his flamboyant and sentimental contemporaries, concerned himself only with the aesthetic aspect and significance of the humble life he painted, and relied on delicacy of treatment and beautiful pigment to achieve beauty. French 18th century painting, however, as shown by Fragonard, Lancret, Pater, Boucher, and others, is essentially the mirror of the artificial mode of life and thought that had followed the heaviness of Louis XIV's reign. J. B. Greuze painted genre with a certain naturalness that did not enter into the sham shepherd and shepherdess compositions of the rest; but even he is not free from the charge of sentimental affectation. Watteau's temperament gave a seriousness to his *Fêtes Galantes*, which renders them unique of their kind.

The basis of this irresponsible and momentarily charming art was Classicism. But it was covered with a pseudo-romantic veneer. The sculpture of the time partook of the same character; that is to say, its aim, first and last, was to please. French sculpture in the Gothic period was entirely subordinate to architecture. The Renais-

sance emancipated it, only to confine it once more within the rigid classicism of the 17th century. Then came the Bernini influence, and a host of rococo imitations of that Italian master. Seemingly the Revolution was needed to bring about a further emancipation both in painting and sculpture. For the first, this event produced Jacques Louis David; for the second, Houdon. David's classical formula was cold and repellent, and his historical compositions are bombastic; but the famous unfinished Mme. Récamier reveals the artist unchained from his conventions. Houdon was the first of a long line of French sculptors who, while working at first on the Greek and later the Renaissance models, designed with personal freedom and feeling. David d'Angers, Rude, Carpeaux, and Barye are names that most readily occur in this distinguished sequence, which, lasting throughout the 19th century, was only interrupted—roughly, perhaps—by the advent of Rodin.

In painting, the dull and lifeless classicism of David and his school waned in the early years of the 19th century. The Romantic movement of 1830 virtually demolished it. Romanticism, of course, was not confined to France, and was as much a literary movement as an artistic one; but it exercised an enormous influence on the future development of French painting. Headed by Eugène Delacroix and Théodore Géricault, it took the form of a revolt against the abstract and impersonal character of Classicism.

#### The Barbizon Group

It was an awakening to the objects of the external world, to the relations of those objects to each other and to their environment. In pure landscape it made possible the emergence of the Barbizon group, of Corot, Rousseau, Daubigny, Millet, and the rest, who in their turn became the forerunners of the Impressionists. Romanticism, in short, was the beginning of the sharp cleavage between academic and independent art which still persists. J. A. D. Ingres and, in a different way, Puvis de Chavannes, were the principal stalwarts of the Classical reaction that made itself felt from time to time during the century; on the other side, Manet, Degas, and their Impressionist followers bore the brunt of an official persecution bitter enough to act as a tonic to men with new ideas.

As the century drew to a close, the development of French independent painting accelerated its pace. Claude Monet, once ac-

claimed as the last word in modern art doctrine, lost his supremacy, through the rise of a new group—the Post-Impressionists. This movement, commonly attributed to Paul Cézanne, Vincent van Gogh, and Paul Gauguin, is described under a separate heading; here it need only be said that its importance lay in the fact of its being the source of a series of revolts that still continue to agitate art circles. These also, viz. Cubism, Futurism, Vorticism, will be found described elsewhere. No one of them is an exclusively French movement; but all have attracted their French enthusiasts. An attempt has been made to group a number of these ultra-modernists under the common title of expressionists. One recent result of their rise, and of the cold-shouldering which the official salons continue to administer to the more extreme exponents of these cults, has been the vast accumulation in Paris of small "independent" galleries.

#### The Modern Movement

Expressionism has invaded French sculpture of to-day, though to a necessarily limited extent; but in painting it provides, for a nation of critics, the sensation of the hour. Maurice Denis, famous as one of the earlier Post-Impressionists, is among the most inventive and capable of the moderns; the idols of *les Jeunes*, however, are Henri Matisse and Derain. Side by side with these recent ebullitions the stream of traditional French art, informed by the classic spirit, continues to run its course; and if this outside movement appears to be even stronger in France than elsewhere, it derives a good deal of its strength from the very tradition of high accomplishment from which it seeks to break away.

French art has reached a stage at which an astonishingly high standard of technical proficiency no longer suffices, and there is a psychological reaction against the cool intellectualism of the older school. But even this is unlikely to disturb seriously the main tradition which is so firmly embedded in the roots of French character.

F. J. Maclean

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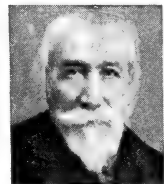
**France, BANK OF.** Chief banking institution of France. Founded Feb. 13, 1800, by Napoleon I, it was granted the privilege of issuing bank notes in 1803. This privilege



Bank of France. The head offices in Paris

became its monopoly in 1848. Although a private joint stock bank, it is subject to state control, holding its peculiar privileges for definite periods. They were last renewed on Dec. 11, 1917, for a period ending Dec. 31, 1945. With branches all over France, it performs important clearing-house functions as well as ordinary banking business. Its capital is fixed at 172 million francs. The maximum note issue at the outbreak of the Great War was 6,800 million francs; by Sept., 1917, it had risen to 24,000 million, and in July, 1919, stood at 40,000 million. Its head offices are in the Rue de la Vrillière, Paris.

**France, ANATOLE (1844-1924).** Pen-name of Jacques Anatole Thibault, French author. Born in



Paris, April 16, 1844, he was the son of a bookseller, whose shop was much frequented by literary men. Educated at the Collège Stanislas, Paris, he early devoted himself to literature, publishing his first book, a study of Alfred de Vigny, in 1868. After producing two volumes of poems in 1873 and 1876, he turned to prose work with the tales, *Jocaste* et *le Chat Maigre*, 1879.

Out of the long succession of

works of fiction, satire, and criticism which France has since produced, the following are the most noteworthy: *Le Crime de Sylvestre Bonnard*, 1881; *Le Livre de mon Ami*, 1885; *Balthazar*, 1889; *Thaïs*, 1890; *La Vie Littéraire*, a series of reprinted essays, 1888-92; *La Rôtisserie de la Reine Pédauque*, 1893; *Les Opinions de M. Jérôme Coignard*, 1893, and *M. Bergeret à Paris*, 1901, two satiric studies of contemporary French affairs; *Pierre Nozière*, 1899;

*Craignebille*, 1902; *Histoire Comique*, 1903; the sceptical but brilliantly written history of Jeanne d'Arc, 1908; the satirical survey of modern French history, *L'Île des Pingouins*, 1908; *Les Dieux ont Soif*, a story of the Revolution, 1912; and another great satire, *La Révolte des Anges*, 1914. Many of his books

have been translated into English. Anatole France was a staunch supporter of Zola in the Dreyfus affair, and a prominent supporter of socialist, radical, and anti-militarist causes. He was elected a member of the French Academy in 1896, and is an officer of the Legion of Honour. He visited England in 1913. He strongly supported his country's entry into the Great War, even offering himself as a volunteer in 1914, and strove always to uphold the idealism of the French cause, publishing a striking appeal to this end, full of his old vigour, in August, 1920.

At once erudite and keenly interested in actuality, he is perhaps the leading figure in contemporary French letters. It is hardly fair to call Anatole France a novelist; rather is he a kindly satirist, using the novel—the  *récit* , as he would style it—as his medium for dissertation and analysis. A master of the impersonal and almost wholly impartial method which only a few of the greatest French writers have successfully compassed, he takes history ancient and modern as his theme; but his delight is in turning ancient or

legendary tales inside out and showing us the modernity inherent in all humanity. In a sense he resembles Bernard Shaw, or even Wells; but he is less ruthless and restless than either, perhaps because he does not indulge either in destruction or in reformation.

On the whole his work leaves us, not the somewhat acid taste of exposure or disillusion, but the pleasant conviction that we now know the humorous as well as the conventional side of whatever subject or personality he puts before us. He is a master of the old as well as of modern French tongue, and uses it freely. He died Oct. 13, 1924. See *Anatole France*. L. P. Shanks, 1919.

**Francesca, PIERO DELLA (c. 1416-92).** Italian painter. He was born at Borgo san Sepolcro, where he died. In 1439 he was employed by Domenico Veneziano on the frescoes of Sant' Egidio, Florence. Later he collaborated with Bramantino at the Vatican, and in 1469 entered the service of duke Federico at Urbino. The master of Perugino and Luca Signorelli, he was learned in the laws of perspective and introduced some improvements in oil-colours.

**Francesca DA RIMINI.** Heroine of a famous Italian love-story. Giovanni Malatesta of Rimini



Francesca da Rimini. The fatal end of the love-story of Paolo and Francesca, as depicted by A. Cabanel

Luxembourg, Paris

(nicknamed Scianciato, the lame) obtained her in marriage from her father, Guido da Polenta, lord of Ravenna, and sent his brother Paolo to fetch her. Francesca and Paolo fell in love and were caught together and slain by Giovanni, 1285. The story was told by Dante in the *Inferno*; it has also been used by Leigh Hunt, 1816, Silvio Pellico, 1818, Stephen Phillips, 1899, and D'Annunzio, 1901. Ingres, 1819, Cabanel, 1870, and G. F. Watts, 1879, have shown the story in paintings, and several operas have been founded on it. See *Dante*; *Rimini*.

**Franceville.** Military station in the Gabun colony of French Equatorial Africa. It is situated on the Passa, an affluent of the Ogowai (Ogoué) river.

**Franche Comté.** District of Europe; in full, the free county of Burgundy. It was first an independent state, then part of the duchy of Burgundy, and finally part of France. Its early capital was Dôle, but after 1678 Besançon; it lay between Lorraine and Switzerland, while through it ran the Saône. After the dissolution of the Frankish Empire the free county was one of the many little states which arose on its ruins. It had its own counts, who retained a practical independence, in spite of occasional interference from the kings of France and Germany, until the 14th century, when it was included in the duchy of Burgundy.

In 1477, on the death of Charles the Bold of Burgundy, it was seized by Louis XI of France, but a few years later it was regained by the emperor Maximilian, the son-in-law of Charles. From Maximilian it passed to Charles V and Philip II of Spain, and then in 1668 it was conquered by Louis XIV of France, who formally secured it by the Treaty of Nimwegen in 1678. The last remains of its independence were then extinguished, and since then it has been part of France. Since the Revolution it has been divided, and now forms the depts. of Haute Saône, Jura and Doubs, and part of the dept. of Ain. *See* Burgundy.

**Franchet d'Esperey, Louis** (b. 1856). French soldier. Born at Mostaganem, Algeria, and educated privately and at St. Cyr, he entered the army in Oct., 1876. He took part in the Tunis operations, 1881-82, in the Tongking expedition, 1885-87, and served in China, 1900-1. He next saw active service in Morocco, 1912-13, and in 1914 was in command of the 1st Army Corps at Lille.



Franchet d'Esperey,  
French soldier

During the Great War he was placed at the head of the French Fifth Army, succeeding Lanrezac after the battle of Charleroi, Aug., 1914. He fought on the right of the British in the 1st battle of the Marne, and gained a victory at Montmirail, Sept., 1914. Later he succeeded in holding the Aisne bridgeheads. In April, 1916, he was placed in command of a group of the armies of the East in France,

and in Jan., 1917, of the group of the armies of the North, which he held till June, 1918, when he was given supreme command of the Allied armies of the Orient, receiving the surrender of Bulgaria, Sept., 1918. He was in command in Turkey-in-Europe until Nov., 1920, and was created marshal, 1921.

**Franchise** (late Lat. *francus*, free). Originally something to which the idea of freedom was attached, i.e. the free grant of a privilege. It is now used in two narrower senses, one in law and the other in politics. In law, a franchise is a privilege granted by the crown to an individual, or more usually to a corporation, such as the right to hold a market or fair, or rights of fishing. This use of the term persists in the United States, where franchises are public rights handed over to private or semi-private bodies.

In politics, the franchise is the right to vote, especially the right to vote at elections of members of parliament. It varies in different countries, but the tendency at present is to bestow it upon all adults, men and women alike. In Australia, New Zealand, and the greater part of Canada the franchise is on these lines, as it is in the states of the U.S.A., in Germany, and in several other countries. Acts of Parliament bestowing the vote on fresh classes of the population are frequently known as Franchise Acts.

In England the franchise was at first the privilege of all freeholders, who voted in the county court; but by an Act of 1430 it was restricted, as far as the counties were concerned, to those whose freeholds were worth 40s. or more. In the towns the franchise varied very much, each borough having its own custom, usually conveyed to it by royal charter. There were variations, too, in the franchise in Scotland and Ireland. Uniformity was first introduced by the Reform Act of 1832. In England, in the counties, it was given, in addition to the existing freeholders, to copyholders and those renting land worth £50 a year. In the boroughs a uniform franchise was introduced, the vote being given to all householders whose premises were worth £10 a year and upwards. In 1867 a second Reform Act reduced the qualifications in the counties to the holders of land worth £12 a year, and in the boroughs gave it to all householders. In addition a lodger franchise was introduced. For Scotland and Ireland there were also Reform Acts, the main principles being the same as in England.

In 1884 a Reform Act introduced uniformity, not only between

county and borough, but between England, Scotland, and Ireland. All householders were given the franchise, as were lodgers in counties as in boroughs. Certain classes were disqualified as before, e.g. aliens and criminals, and women were still excluded. In addition there was still a university franchise, based on the possession of a degree. In 1867 proposals for what were called fancy franchises were made, but were not passed into law.

The important Act of 1918 conferred the franchise on women, giving the vote to all adult males and to women over 30 years of age, six months' residence or occupation of business premises of the value of £10 a year or over being necessary in the case of men.

In addition to the parliamentary franchise there has been in the United Kingdom a uniform municipal franchise since 1835, in which women have been included. Other franchises are the right to vote at elections for county councillors, introduced in 1888, and the right to vote at elections for urban and rural district councillors, dating from 1894. From this use of the word comes enfranchise, to bestow the vote, or, as frequently used, to give a place the right of representation in Parliament; and disfranchise, to take it away. *See* Election; England; Local Government; Parliament; Reform Acts; Representation; Vote.

**Francia, FRANCESCO** (c. 1450-1517). Italian painter. He was born at Bologna, his real name being Francesco Raibolini, and was apprenticed to a goldsmith. He achieved distinction as a worker in metal, in niello, and in type-founding, but shortly after the coming of Lorenzo Costa to Bologna, 1483, he became a painter. Costa and



Francia. Madonna, Infant Jesus, and S. John, an example of the artist's work in the Dresden Gallery

Francia were associated in an altarpiece for the Church of the Misericordia, Bologna, Francia's earliest dated work. Though at first he followed Costa's style he quickly surpassed that master in power of conception and colour. The Madonna and Saints, with S. Anne enthroned, in the National Gallery, London, is one of his masterpieces, but he is best studied at Bologna.

His famous Baptism of Christ is at Dresden. Among his portraits are those of Bartolommeo Bianchini (Salting collection), The Marchese Bovio (Lichtenstein Gallery, Vienna), Prince Federico Gonzaga (Leatham collection). In fresco two episodes from the life of S. Cecilia survive in the chapel of that saint at Bologna. He died at Bologna, Jan. 6, 1517. *See* Life, G. C. Williamson, 1901.

**Francia**, JOSÉ GASPAR RODRÍGUEZ (1757-1840). Dictator of Paraguay. Born at Asunción, of Portuguese origin, and educated at the university of Córdoba de Tucumán, he first studied theology, but after taking his degree practised law. In 1811 Paraguay declared itself independent of Spain, and Francia, the ablest of its revolu-

tionary leaders, became secretary of the national junta, joint dictator, 1813, joint dictator for three years, 1814, and sole dictator for life, 1816. In 1816 he dissolved congress, and for the rest of his life ruled tyrannically but beneficially. His vigorous opposition to intercourse with other countries resulted in the development of Paraguay's resources. He died Sept. 20, 1840.

**Franciade**. Name given to each period of four years in the new calendar set up by the authors of the French Revolution in 1793. The idea and form of the word were derived from the Greek Olympiad. *See* Calendar.

**Francis**. Christian name, used by both males and females. It is derived from the word frank, free, and was first used in France in the form François. It passed over to England about the time of Henry VIII, in the form of Francis. In the 18th century the form Frances began to be used for girls. Frank is a variant. The German equivalent is Franz, a popular name in that country, and the Italian is Francesco. Francesca is the Italian feminine, and Franziska the German.

began a life of religious vagabondage — or rather, knight-errantry. We find him repairing S. Damiano with his own hands, tending the lepers and living among them, preaching in the streets and public squares, and often treated as a madman. At last, apparently on Feb. 24, 1209, the gospel for the day suggested a more definite rule of life (Matt. x, 7-10). Thenceforward he took as his ideal the literal imitation of Christ, and became perhaps the most Christlike of all the figures in Church history.

#### Foundation of His Order

At the end of 1209, or more probably in 1210, having already a small group of disciples, he went to Rome and begged Innocent III to confirm a brief rule which he had drawn up, and thus to authorise a new religious order. The monks were individually poor, but held corporate endowments. The friar was to be moneyless, not only individually but also in the mass; he was to live by the labour of his hands if possible, and, where that failed, by begging. The pope, after some natural hesitation, consented. The new order multiplied rapidly, thanks to the personal influence of Francis and to the crying need of the times.

Many reformers, in the latter half of the 12th century, had aimed at a return to apostolic life; but, sooner or later, all of these came into conflict with the Church. S. Francis combined the most extraordinary religious zeal and charity with a spirit of complete devotion to the hierarchy, and was thus able to renew religious life in Europe without breaking with the Church. There can be little doubt that he and his followers postponed the religious revolution of the 16th century by several generations. Yet this reconciliation was not effected without considerable sacrifices of ideal.

#### Suffering and Self-Sacrifice

As time went on S. Francis rose to even greater heights of suffering and self-sacrifice, but he lacked the more ordinary qualities required in the general of a religious order. Here his zeal for conversions actually stood in his way. Apart from his frequent missionary journeys in Italy, he planned others abroad. In 1212 he started for Palestine, but was driven by storms to the N.E. coast of the Adriatic. In 1214 he went to preach in Spain; in 1217 he was with difficulty restrained from a similar journey to France. In 1219 he at last found his way to Syria and Palestine, and was away more than a year.

## FRANCIS: THE SAINT OF ASSISI

G. G. Coulton, Author of *From St. Francis to Dante*

*The life and work of this saint is a necessary introduction to the articles on Monasticism; Franciscans; and on the other religious orders*

Francis of Assisi was born in or about the year 1182. His father, Pietro di Bernardone, was a cloth merchant, and belonged to the commercial aristocracy of Assisi. Pietro was travelling in France when the son was born to whom on his return he gave the then unusual name of Francesco. The saint's youth was marked by a love of pleasure, society, and song; all his life he retained a strong affection for the French language — then the literary language of Europe — though he could never speak it well. As he grew up he began to repent of his irregularities, which had always been those of a generous and refined nature.

In 1202 Francis was taken prisoner in battle against the Perugians, and remained in captivity for a year, during which he was noted for his gaiety and his forbearance towards his fellow-prisoners. Returning to his former dissipations, he fell seriously ill, and, in a moment of convalescence, gazing out upon the landscape beneath the walls of Assisi, he found that "neither the beauty of the fields, the pleasantness of the vineyards, nor anything that is fair to see could in any wise delight him. . . . And from that day he began to despise himself, and in some

sort to hold in contempt what he had admired and loved before; yet not altogether, for he had not yet been loosed from the bonds of vanity." He dreamed of military fame, and had actually started on an expedition to Apulia when a vision recalled him. His gaiety now became more fitful; he was penetrated with a deeper pity for the poor, and especially for lepers; the self-conquest which first enabled him to kiss a leper marked a fresh step in his spiritual life.

#### A Religious Knight-errant

Francis now spent much time in solitary prayer, and at one of these moments, in the little half-ruined church of S. Damiano, the crucifix seemed to speak to him with an articulate voice: "Francis, go repair My House, which as thou seest is wholly falling into ruin." Taking these words too literally, he sought to assist the reparation of S. Damiano by selling one of his father's horses with a load of valuable cloth. The result was a complete rupture between him and his father, and the saint went forth naked into the world. "Henceforth I may say freely 'Our Father which art in heaven,' and no longer 'father Pietro di Bernardone.'"

This was in 1207. Francis then

During his absence in Palestine, his vicars joined with other notables in a policy which tended to bring the Franciscans into line with the older orders. At this news he suddenly returned (summer of 1220), but was unable entirely to check the movement, which had considerable support from the papal court. Recognizing his own want of strictly business qualities, he resigned the direction of the Order to Pietro dei Cattani as vicar-general, and from this time forward could only protest against the formalism which was creeping steadily into his Order. The rest of his life was spent in missionary journeys about Italy, and in remote hermitages where he gave himself up increasingly to the contemplation of Christ's passion. At one of these (La Vernia, Sept., 1224) he is said to have miraculously received the Stigmata, or five wounds of Christ. He died Oct. 3, 1226. *See* Assisi, *illus.*

**Bibliography.** *The Mirror of Perfection*, ascribed to Leo of Assisi, Eng. trans. S. Evans, 1898; *The Little Flowers of St. Francis*, Eng. trans. T. W. Arnold, 1908; *Lives*, Paul Sabatier, Eng. trans. L. S. Houghton, 1894; Thomas of Celano, Eng. trans. A. G. Ferrers Howell, 1908; J. Jørgensen, Eng. trans. T. O'Connor Sloane, 1912; *Father Cuthbert*, 1912; *A Guide to Franciscan Studies*, A. G. Little, 1920.

**Francis of PAOLA** (c. 1416-1507). Saint and founder of the Order of Friars Minims. Born at Paolo, of poor parents, when 15 years old he became a hermit. Being soon joined by others, he founded an order in 1436. Their first monastery was built in 1454, and the new order was authorised by Pope Sixtus IV in 1474. Other monasteries were founded in Italy, Sicily, France, and Germany, before Francis's death at Plessis-les-Tours, April 2, 1507.

**Francis DE SALES** (1567-1622). Saint and writer. Born of a noble family at Annecy, Savoy, Aug. 21,



Francis de Sales,  
French saint

1567, he was educated at Paris and Padua. He was a great champion of the Roman Catholic faith, had several friendly but fruitless discussions with Beza, and won many Protestants to his own church, especially by his preaching in the Calvinist province of Chablais, 1594-98, and in Paris, 1602. In Sept., 1602, he became bishop of Geneva. In 1610 he founded the order of Nuns of the



S. Francis of Assisi, when dying, carried upon a litter to bless the town of Assisi. From a painting by L. Benonville

Visitation. He was a man of saintly life. His *Introduction to the Devout Life*, 1609, is translated into many languages, and highly esteemed by Christian people generally. He died at Lyons, Dec. 28, 1622, was canonised in 1665, and adopted as the patron saint of writers and journalists in 1923. *See* works, ed. H. B. Mackey (Annecy), 1892, etc.; *Lives*, H. L. Lear, 1871, M. M. M. Scott, 1913; *The Spirit of St. Francis de Sales*, J. P. Camus, ed. Archbp. of Westminster, 1910.

**Francis I** (1708-65). German king and Roman emperor. The son of Leopold, duke of Lorraine, and



Francis I,  
German king

through his mother, a grandson of Philip, duke of Orleans, he was born Dec. 8, 1708. Related to the Hapsburgs, he was educated in the court circle at Vienna, and a marriage was arranged between him and the future empress, Maria Theresa. In 1729 he became duke of Lorraine, but in 1735 he exchanged that duchy for Tuscany, of which he became grand duke when the last Medici ruler died in 1737, having in the meantime (1736) been married to Maria Theresa. In 1740 his father-in-law, the emperor Charles VI, died, and the war of the Austrian succession began. In the struggle against Frederick the Great, Maria, not her husband, was the dominant figure, and her efforts resulted in 1745 in the election of Francis as emperor. He died at Innsbruck, Aug. 18, 1765, having been merely the assistant of his wife. From the pair the existing Hapsburgs are descended, hence the family is known as Hapsburg-Lorraine. *See* Maria Theresa.

**Francis II** (1768-1835). Emperor of Austria and last ruler of the Holy Roman Empire. Born in



Francis II,  
Emperor of Austria

Florence, Feb. 12, 1768, he was educated there and in Vienna. His father, hitherto grand duke of Tuscany, became Roman emperor as Leopold II in 1790, and two years later (March 1, 1792) Francis succeeded him. A little earlier the French Revolution had begun. Francis's aunt was Marie Antoinette, and on both public and private grounds he was soon committed to the war against France. One disaster followed another. He was forced to make the treaty of Campo Formio, and later that of Pressburg. The Netherlands were in revolt; Russia and Turkey were willing to take advantage of his difficulties. The states of Germany lost their last vestiges of unity, and in 1804 Francis took the title of emperor of Austria, thus seeking to unite more closely the various lands, Hungary and Bohemia among them, over which he really ruled. In 1806 the Holy Roman Empire, of which he was the nominal head, ceased to exist.

Although he had Metternich for his minister, Francis took a leading part in controlling the policy of Austria, both domestic and foreign. He came to terms with Napoleon, giving him his daughter in marriage; but in 1813 he joined the Allies, and his armies assisted in Napoleon's defeat. He died March 2, 1835. He was four times married, and left his successor, Ferdinand I, and other children, one being the father of the emperor Francis Joseph. *See* Europe: History; Vienna, Congress of.

**Francis I** (1494–1547). King of France. Son of Charles of Valois, he was born at Cognac, Sept. 12,



1494, and in 1515 succeeded his cousin Louis XII, whose daughter he had married in 1512. He invaded Italy and defeated the duke of Milan at Marignano in 1515. In 1519 he made an unsuccessful bid for the imperial crown, which Charles V obtained, and the famous rivalry of the two monarchs began. Francis's attempted alliance with Henry VIII of England, at the Field of the Cloth of Gold, 1520, came to nothing, but he again invaded Italy, 1525, and was captured at Pavia, Feb. 25. Kept prisoner at Madrid, he was set free in 1526 on surrendering Burgundy and abandoning various claims in favour of Charles. Once free, however, he renewed hostilities, and won certain modifications from Charles in 1529, whose sister Margaret he married, 1530.

The struggle was resumed in 1536, Francis making useful alliances with the German Protestant princes, and with the sultan Solym I (1542), but had reached no definite conclusion on his death at Rambouillet, March 31, 1547. Despite the jealousies and vacillations of his foreign policy, Francis greatly strengthened the royal power. He secured for himself the nomination of bishops, reduced the judiciary powers of the nobility, strengthened provincial administration, reformed the national exchequer, and reconstituted the permanent army. A patron of many notable artists and writers of the Renaissance, he founded the Collège de France, 1530.

**Francis II** (1544–60). King of France. Born at Fontainebleau, Jan. 19, 1544, he was the eldest son of Henry II. He was married to Mary Stuart, Queen of Scots, 1558, and became king on his father's murder in April, 1559. His reign only lasted for a year and a half.



Francis II,  
King of France

and during that time the government was conducted by his mother, Catherine de' Medici, and his kinsmen, the Guises. He died suddenly at Paris, Dec. 5, 1560. *See* Chenonceaux, illus.

**Francis I** (1777–1830). King of the Two Sicilies. Son of Ferdinand I, he was born in Naples, Aug. 19, 1777. In 1812 his father made him regent of Sicily and in 1820 regent of Naples. He came to the throne in 1824 and placed himself under the tutelage of Austria, inaugurating an era of oppression and corruption which reduced his subjects to despair. An insurrection in 1828 was put down with unexampled cruelty, the commune of Bosco being razed to the ground. His alarm at the French revolution of 1830, and the fear of the vengeance of his own people, caused his death, Nov. 8, 1830.

**Francis II** (1836–94). King of the Two Sicilies. Son of Ferdinand II (Bomba), he was born Jan. 16, 1836, and ascended the throne in 1859. Characterless and weak, he rejected all proposals of reform until Garibaldi's invasion of Sicily, 1860, when his tardy offer of a constitution was rejected by his people. He fled to Capua and thence to Gaeta, which, after a brief siege, surrendered, Feb. 12, 1861. The kingdom was incorporated with Italy and Francis took refuge in Rome. After 1870, Francis lived in Germany and Austria, dying at Arco, Dec. 27, 1894.

**Francis, JOHN** (1811–82). Publisher of *The Athenaeum*. Born in Bermondsey, July 18, 1811, and apprenticed to a London newspaper agent, he entered *The Athenaeum* office as a clerk, Sept., 1831, and became business manager and publisher of that paper in Oct., 1832. He retained this post for nearly 50 years, also supervising the commercial side of Notes and Queries from 1872. He took an active part in the campaign for the repeal of the advertisement, stamp, and paper duties, 1853–61. He died April 6, 1882, and was succeeded by his eldest son, John Collins Francis (d. 1916), who wrote a memoir of his father, 1888.

**Francis, MARY E.** Pen-name of Mary E. Blundell, British novelist.

Born at Killiney Park, Dublin, a daughter of Michael James Sweetman, she married Francis Nicholas Blundell in 1879. Having early achieved success with her



Mary E. Francis,  
British novelist

stories of North Lancashire life and character, she enhanced her reputation by studies of Dorset life. Her books included *Whither?*, 1892; *In a North Country Village*, 1893; *A Daughter of the Soil*, 1895; *Pastorals of Dorset*, 1901; *The Manor Farm*, 1902; *Dorset Dear*, 1905; *The Story of Mary Dunne*, 1913; *A Maid o' Dorset*, 1917; and *Beck of Beckford*, 1920. She also wrote some plays, *The Widow Woos*, 1904 (intro. Sydney Valentine); *The Third Time of Asking*, 1906; and *Fiander's Widow* (in collaboration with Sydney Valentine), 1907.

**Francis, SIR PHILIP** (1740–1818). Supposed author of *The Letters of Junius* (q.v.). The only



Francis  
After J. Lonsdale

son of Philip Francis (c. 1708–73), the translator of Horace, he was born in Dublin, Oct. 22, 1740. Educated in Dublin and at S. Paul's School, London, where H. S. Woodfall and P. Rosenhagen were his friends, he filled several minor government appointments and was first clerk at the war office, 1762–72. He married in 1762 a Miss Macrabie (d. 1806).

A member of the council of Bengal, 1774–81, he quarrelled with Warren Hastings, who wounded him in a pistol duel, 1779. He paid 50,000 rupees as defendant in a marital action brought by G. F. Grand, an officer in the East India Company's service, whose young wife, after living for a time under the protection of Francis, became in 1801 the wife of Talleyrand, and returned to England with a large fortune. He was M.P. for Yarmouth, I.W., 1784; Blethingley, 1790; and Appleby, 1802; assisted Burke in impeaching Warren Hastings; incurred the enmity of William Pitt; became an intimate of the Prince Regent; and supported Wilberforce against the slave trade. In 1793 he founded the Society of Friends of the People; received in 1806 a K.C.B. instead of the coveted office of governor-general of India, and in 1814 married Emma Watkins, whom he encouraged in her belief that he was the author of the *Junius Letters*. He died in London, Dec. 22, 1818. *See* *Memoirs*, J. Parkes and H. Merivale, 1867; *Echoes from Old Calcutta*, H. E. Busteed, 3rd ed. 1897.



**Francis Ferdinand** (1863-1914). Austrian archduke. Son of the archduke Charles Louis and nephew of the emperor Francis Joseph, he was born at Graz, Dec. 18, 1863. After inheriting, in 1875, the wealth and titles of the house of Hapsburg-Este, formerly dukes of Modena, he became, by the suicide of the crown prince Rudolf in 1889, heir-apparent to the crown of Austria-Hungary. On his morganatic marriage in 1900 to the Countess Sophia Chotek, who was created Princess Hohenberg, he renounced for the children the right of succession, but his own position remained, and for the next fourteen years he was one of the directors of the policy of Austria-Hungary. He was making a tour in Bosnia when he was assassinated at Sarajevo, June 28, 1914, a crime which precipitated the Great War.

Francis Ferdinand,  
Austrian archduke

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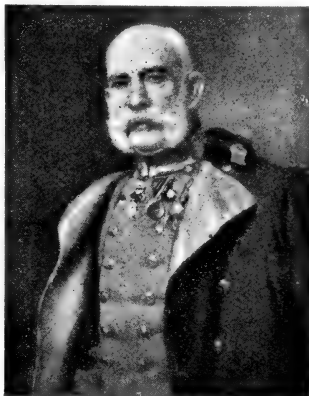
**Francis Joseph I** (1830-1916). Emperor of Austria. The eldest son of the archduke Francis and a grandson of the emperor Francis II, he was born at Vienna, Aug. 18, 1830. He was educated carefully but narrowly, as all the Hapsburgs, and owed much to the strong character of his mother, Sophia, daughter of Maximilian I of Bavaria. In 1848 the shaking throne was occupied by Ferdinand, a childless imbecile. The hopes of the Hapsburgs were therefore centred on Francis Joseph, his nephew, and it was decided that he, who came of age Aug. 18, 1848, should be placed upon the throne.

Francis Joseph reigned from Dec. 2, 1848, until Nov. 21, 1916, one of the longest reigns in the world's history. But its interest is not so much in its length as in its vicissitudes. He saw Austria lose her possessions in Italy, 1859, and, defeated by Prussia, 1866, driven from the German confederation. He saw the results of a hated rule in continuous discontent in Hungary and Bohemia. The acquisition of Bosnia and Herzegovina, 1908, hardly compensated for endless difficulties with the Balkan states, for the growing suspicions of Russia, or for disorder in the national finances, while Austria's adhesion to the Triple Alliance made her more than ever subordinate to Prussia.

His private life was even more tragic. His wife Elizabeth, daughter of Maximilian Joseph, duke of Bavaria, was assassinated

at Geneva in 1897; his only son, Rudolph, committed suicide, or was killed, in 1889; his nephew and heir, the archduke Francis Ferdinand, was murdered at Sarajevo, June 28, 1914, with the most momentous consequences.

The emperor took a real part in ruling his empire with its warring races and inherited difficulties, and but for him it is probable that it would have fallen to pieces before it did. He was diligent and up to a point capable, but his outlook was narrow, and he could hardly be expected to understand, still less



*Francis Joseph I*

After L. Horowitz

to sympathise with, the liberal movement that shook Europe during his earlier years. His policy and actions, which have been described as opportunist, show little trace of consistency.

His earliest troubles were with Hungary; it was not until 1867 that he was there recognized as king. His life story is that of Austria-Hungary, and to a large extent that of Europe, including Germany, which before the war of 1866 he tried hard to unite under his own overlordship. He died Nov. 21, 1916, and was succeeded by his grand nephew, the archduke Charles, who abdicated, Nov. 1918. His surviving family consisted of two daughters. *See* Austria - Hungary; Hapsburg; consult also Lives, R. P. Mahaffy, 1908; F. H. Gribble, 1914; The Real Francis Joseph, H. de Weindl, Eng. trans. P. W. Sergeant, 1909.

**Franciscans.** Order of friars, also known as Friars Minor or Minorites, or Grey Friars, founded in 1209 by S. Francis of Assisi (*q.v.*).

The first general chapter, in 1219, was attended by upwards of 5,000 members. The rule was solemnly

ratified by Honorius III in 1223. A year later the order was established in England, at Canterbury. Following a relaxation of the strict rule of poverty, the order was divided into Conventuals, who lived in large convents under modified conditions; and Observantines, who adhered to the original rule. Known in France as Cordeliers, the Observantines subsequently divided into Observants, Reformed, Discalced, Recollects, and Capuchins.

In 1897, as a result of the efforts of Leo XIII, while the Conventuals and Capuchins remained distinct, the other branches or families of the order were united under the name of *Ordo Fratrum Minorum*, or Friars Minor. The original dress of the order consisted of a coarse grey cloth habit, with pointed hood, under-tunic, drawers, and waistcord. Five popes and more than 50 cardinals have belonged to the order, which numbered among its members Cardinal Ximenes, S. Bonaventure, Duns Scotus, Alexander of Hales, Roger Bacon, and William of Ockham.

Allied to it, as a second order, were the Poor Clares, and, as a third order, the Tertiaries. In the second half of the 14th century its monasteries were computed at 1,500 with 90,000 friars. At the dissolution the houses in England numbered 64. *See* Monasticism; Poor Clares; Tertiaries; consult also *Annales Minorum*, L. Wadding, 1625-54; republ. with additions, Rome, 1731-1887. *See* Cowl, illus.

**Francistown.** Town of the Bechuanaland Protectorate, S. Africa. In the Tati Concession, it stands near the Shashi river, 50 m. N.W. of Tati, and near the border of S. Rhodesia.

**Franck, CÉSAR AUGUSTE** (1822-90). French music composer. Born at Liège, Dec. 10, 1822, he studied at the Conservatoire there, and at Paris. After teaching for two years in Belgium, he settled in Paris in 1844, and devoted himself to teaching and composition. In 1858 he became organist at the church of S. Clotilde, and in 1872



Franciscan. Dress  
of the order

professor of the organ at the Conservatoire. He composed a large amount of music of varying merit, chiefly the oratorio *Les Béatitudes*, orchestral works, including *Ruth*, *Redemption*, and *Rebecca*, and chamber music, notably a quintet for piano and strings, and a string quartet. He died Nov. 8, 1890. Franck's influence upon his pupils was great, and he has been described as the greatest of modern French teachers, and probably the greatest of church organists and composers since Bach. *See* Life, V. d'Indy, Eng. trans. R. Newmarch, 1910.

**Franck, SEBASTIAN** (c. 1499-1542). German writer. Born at Donauworth, he was trained for the priesthood at Ingolstadt and Heidelberg. He had already taken orders when, about 1525, he became a Protestant. He was banished from Strasbourg on account of his opinions in 1531, and settled at Ulm; but the publication of his *Guldin Arch*, 1538, led to his expulsion therefrom in 1539. He then went to Basel, and died there. His collection of German Proverbs, 1541, enjoyed a long popularity. His other writings are all remarkable for their freedom of thought, in which Franck was a pioneer.

**Francke, AUGUST HERMANN** (1663-1727). German educationist. Born at Lübeck, March 23, 1663, he was trained at Erfurt and Kiel, and studied Hebrew at Hamburg. Settling at Leipzig, he established a kind of literary club, under the name of *Collegium Philobiblicum*. He taught Greek and Oriental languages at Halle University, where he established a paedagogium and orphans' house (1698), the success of which attracted much attention among philanthropists in England. Francke became famous through his lectures on the Bible. He wrote much on Biblical and educational subjects. *See* Faith's Work Perfected (Eng. trans. of Francke's *Pietas Hallensis*), ed. W. L. Gage, 1867.

**Francolin** OR SPUR-LEGGED PARTRIDGE (*Francolinus*). Group of game birds, of which over forty species are recognized. Most of them are mottled with black, brown, and white; they are found in Africa and S. Asia, and one species formerly occurred in Sicily, but appears to be extinct there now. They live among the high grass in the valleys.

**Franconia** (LAND OF THE FRANKS). Name given in the 9th and 10th centuries to one of the great duchies into which Germany was divided. It was the one founded and inhabited, as the people believed, by the Franks. The west-

central part of Germany, it was the district through which the Main runs, although a portion of it, including the cities of Mainz, Worms, and Spire, was on the W. side of the Rhine. Its capital was Frankfurt.

The duchy had only a short life, as a few years after 1024, when its duke, Conrad II, became German king, it was broken up among various princes, especially the archbishop of Mainz, and the bishops of Worms, Spire, and Würzburg.

## FRANCO-PRUSSIAN WAR, 1870-71

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*In addition to this general sketch there are articles on Metz, Sedan, and the other great battles of the war. See also Bazaine; Bismarck; Moltke; Napoleon III; William I; and the articles France; Germany*

Prussia, desiring to lead the movement towards German unity, had an ambitious king in William I; a clever and not too scrupulous statesman in Bismarck; a great strategist in Moltke; and a sound military organizer in Roon. The short campaign of 1864, in which Austria and Prussia overwhelmed Denmark and robbed her of Slesvig-Holstein, served Prussia as a practical lesson in her scheme of mobilisation, which she now laboured to improve. Two years later she showed Austria how much she had benefited by the experience, and taught the rest of Germany to look to Prussia as their head. The four great leaders of Prussia again used this war of 1866 as a training ground for perfecting their military organization, and prevailed upon the other German states, secretly, to place their troops under Prussian control.

France was ruled by Napoleon III, who had gained a small military reputation through the Crimean War, and his campaign in Italy in 1859; but the world generally, and Bismarck in particular, had discovered that he was not a great general. In pursuit of his ambition, he wished to push the French frontier to the Rhine, and hoped by military glory to remove his subjects' growing dissatisfaction with his inefficiency as a ruler. He further thought that Austria would join him to revenge 1866, and that Italy might also help him.

### Declaration of War

Thus there were the makings of war if anything occurred to start it. On July 3, 1870, Prince Leopold of Hohenzollern-Sigmaringen was selected for the vacant throne of Spain. Napoleon feared a Prussianised state on his Spanish frontier, and demanded that the idea should be abandoned. Bismarck knew that Germany was ready for war, and that France was not as ready

The name, however, remained in use for the eastern part of the old duchy, that on the E. of the Rhine. It was given in 1500 to one of the circles into which Germany was divided, and for over 300 years before 1802 the bishops of Würzburg called themselves dukes of Franconia. The Bavarian portion of old Franconia is now divided into three parts: Franconia, capital Baireuth; Middle Franconia, capital Ansbach; and Lower Franconia, capital Würzburg.

as Napoleon believed, and by a telegram, which did not truly represent King William's words, sent French feeling to fever point. Rulers on both sides desired war, and war was declared on July 19. Both Austria and Italy declined to intervene. Napoleon believed his ministers' assurance that his army was "ready to the last gaiter-button," whereas in reality it was badly trained and badly found, and the mobilisation plans were most imperfect; he showed his inability as a strategist in that his initial plan was to cross the Rhine and endeavour to separate the South German states from the Prussians, whom he could not believe they really loved. This was true in part, and could he have been ready first, it was a possibility that a separated South Germany would not have proved such loyal allies to Prussia as they afterwards turned out to be.

### Organization of Prussian Army

The Germans were organized in three armies. The first or northern one, under Steinmetz; the second, under Prince Frederick Charles, the "Red Prince"; the third or southern army, under the Crown Prince. The first actual conflict of forces larger than reconnoitring parties took place at Sarrebruck on Aug. 2, when the French drove back a few battalions and crossed the frontier. This fight was given undue prominence as a French victory, because it was the *baptême de feu* of the little Prince Imperial.

The positions of the opposing forces on Aug. 4 were as follows: The French were strung out along the frontier in Alsace-Lorraine, from Strasbourg in the S. to Sarrebruck in the N.; perhaps 150,000 E. of Metz; but the mobilisation was so incomplete and so confused that not even the French High Command knew where battalions were, or the precise number of troops in any division. Strasbourg

and Metz were important fortresses, which should have been well supplied for a siege.

The crown prince's army was S. of Landau, assembled for the march which carried it over the frontier. The second army was marching through the Haardt Wald by Kaiserslautern. The first army, held back by von Moltke, was cantoned between Neunkirchen, Tholey, and Lebach, making altogether a total of some 450,000 men.

On Aug. 6 came the first real clash of arms. To the S. the crown prince's army, which had driven in MacMahon's outposts from Wissembourg on Aug. 4, defeated him severely on this day at Wörth, and drove his force headlong from the field. On the same day there was an important battle near Spicheren, where the advanced guards of the first and second armies forced back Frossard. So severe were these blows that nothing remained for Napoleon but to form "the army of the Rhine" round Metz, under Bazaine, while MacMahon gathered together fragments into another army at Châlons; thus abandoning the whole of Alsace-Lorraine, except the fortresses, to the enemy.

#### Disaster of Sedan

The Germans, not entirely untouched by the two battles, for the French soldiers had fought well, and confronted by the new situation, paused for a moment before they pressed forward in overwhelming strength. By Aug. 14 the German advanced guards interrupted a commencing retreat of Bazaine's troops from the E. of Metz, and brought about the battle of Colombey-Nouilly, which seriously interfered with French plans. Two days later the second army, which had crossed the Meuse S. of Metz, again interfered with the proposed retreat on Verdun, by the battle of Vionville-Mars-la-Tour, and compelled Bazaine, on Aug. 18, to fight the battle of Gravelotte. Unsuccessful in this, he was driven inside the Metz fortifications.

With these reverses the second empire was tottering to its fall. The moral of the French troops was infected by the cry of "We are betrayed," and this feeling had its reflection, or its origin, in Paris. The emperor was with the army, doing little to save the situation; while the empress Eugénie in Paris was doing her best in a falling cause. MacMahon was now directed to effect the relief of Metz, and commenced the desperate march N. and E. which ended at Sedan.

The Germans, well informed of French movements, had left a sufficient investing force to hold Bazaine, and so liberated a for-

midable army to deal with MacMahon. Caught up at Beaumont on Aug. 28, and forced back on Sedan with the Belgian frontier behind him, MacMahon fought a desperate losing action on Aug. 31 and Sept. 1. MacMahon was wounded, and on Sept. 2 de Wimpfen signed the surrender of the last imperial army in the field. Napoleon was present and became a prisoner of war. On Aug. 31 Bazaine made a desperate attempt to break out of Metz, but was driven back under the guns of the place, where he remained until the surrender of his whole army on Oct. 27. Strasbourg, after a ferocious bombardment, had undergone a regular siege. Its commander, General Urich, held out until the inhabitants were in a state of starvation and his defences were pierced. He surrendered to General Werder on Sept. 27.

On Sunday, Sept. 4, the empress fled from the Tuileries, and on the 5th a republic was proclaimed, with General Trochu as president and governor of Paris, with full military powers for national defence; Jules Favre became minister of foreign affairs and Gambetta minister of the interior. Energetic measures were taken for the defence of the capital and for the formation of a national army, but there were enormous difficulties to contend with. The German forces were moving forward practically unresisted to invest Paris, and probably at this time an opportunity was lost which would have saved both nations a vast amount of suffering and expense. On Sept. 19 negotiations for an armistice were almost concluded by Bismarck and Jules Favre, but the chancellor demanded the surrender of Strasbourg, Toul, and Verdun; and these conditions the provisional government would not accept.

#### The Siege of Paris

The French position was practically hopeless. On Sept. 20 Paris was closed in. In the fortnight possible for preparation, Trochu had swept into the place all available food, guns, and troops; raised volunteer corps from the inhabitants, and had done all that a man might to hold out for a long siege. The fortifications were formidable, but so were the German forces. The defence of a large town is no easy problem, since starvation is such an invaluable ally to the besiegers, yet Paris had a great spirit, and hoped greatly for relief from newly formed armies.

Gambetta escaped from Paris in a balloon, and from Tours roused the country to arms; but

it is no easy task hastily to improvise armies, however many high-spirited men may be available. There were no great generals, no trained officer corps; arms and stores were lacking. An army of the north was formed about Soissons and Amiens under Faidherbe, and a numerically stronger Loire army about Orleans. By the beginning of December the Germans had the northern half of France in their grasp. They had taken the large and important fortified towns of Nancy, Strasbourg, Metz, Reims, Dijon, Laon, Soissons, Orleans, and Rouen, and were operating under the able direction of von Moltke with well-found armies in every direction. The army of the Loire was driven from Orleans on Dec. 3, and from that time became a negligible factor for the relief of Paris.

An army had been formed in the Vosges under the leadership of Garibaldi, and fighting in the neighbourhood of Dijon afforded a little distraction, but no real effect. The army of the north was severely defeated early in Jan., 1871. In the S.E. General Bourbaki had collected a considerable force to raise the siege of Belfort, but equal failure attended its efforts; and early in Feb. his army was compelled to retreat over the Swiss frontier and give up its arms.

#### Germany's Peace Terms

It was a terribly severe winter and the sufferings of the ill-found French soldiers were appalling, while the Germans were able to fight in comparative comfort. Paris during January was being regularly bombarded, and in addition was enduring the pangs of hunger. Disease and death were rampant, and the necessity for capitulation had become evident. General Trochu resigned, and Jules Favre was sent to arrange terms of surrender at Versailles, where William, now crowned as German emperor, had taken up his headquarters. Negotiations were opened on Jan. 24; a general armistice was proclaimed and the terms of surrender were definitely settled on the 28th. By the peace treaty, France lost her provinces of Alsace and Lorraine, and paid Germany a war indemnity of £200,000,000.

*Bibliography.* German Official Account, Eng. trans. F. C. M. Clarke, 1874-84; French Official Account, 1901, etc.; The Campaign of Sedan, G. Hooper (1887), repr. 1914; La Guerre, 1870-71, A. Chuquet, 1895; Bibliographie Générale de la Guerre de 1870-71, B. E. Palat, 1896; Saarbrück to Paris, 1870, a strategic sketch, S. C. Pratt, 1904; The Franco-German War, 1870-71, F. B. Maurice, 1909 (in Camb. Modern History, vol. 11).

**Franc-tireur** (Fr., free shooter). Term employed to designate the bands of men who, though unconnected in any way with the regular troops, greatly harassed the Germans during the Franco-Prussian War. These bands were no uniform, and, if detected, posed as civilians. Despite the fact that if caught they were immediately hanged, many alien French sympathisers served the country in this way, and it is estimated that not less than 35,000 men were so employed. The term francs-tireurs was also applied to organized bodies of volunteers, notably the Gardes Mobiles and an Italian contingent who cooperated with the French troops round Orleans in 1870. At the best, francs-tireurs are therefore organized corps of irregular troops, acting under a permanent leader, who wear some kind of uniform, if only a brassard, and who conform to the usages of war; while at their worst they are merely bands of tolerated assassins, whose conduct exasperates trained troops and results in innocent civilians suffering for their deeds. During the Great War the Germans made many accusations, more especially against the Belgians, of the employment of francs-tireurs against their invading armies.

**Franker.** Town of Holland. In the province of Friesland, it is 10 m. W. of Leeuwarden, and is served by both rly. and canal. It has a celebrated school, the successor of the university that flourished here from 1585 to 1811. S. Martin's, a 15th century building, is the chief church. There is a 16th century town hall and an observatory. The town has small manufactures and a trade in agricultural produce. Pop. 7,642.

**Frangipani.** Name of a powerful Roman family. It arose in the 11th century, and was conspicuous in the struggles of Guelf and Ghibelline in the two following centuries. Members of it still exist in Italy. Frangipani is also the name of a powerful scent, and of a kind of sweetmeat.

**Frank Almoign.** Term of French origin, meaning free alms. It is used for the kind of land tenure by which religious houses and corporations held their lands, and to some extent do so still. The idea behind it is that the land is held on the condition that, instead of military service, religious offices shall be performed. This form of tenure is very old, and was not confined to England. There it was largely stopped by the famous Act of 1290, which forbade any such tenures to be created save by the king. See Land Laws; Quia

Emptores; Tenure; consult also History of English Law, Pollock and Maitland, 2nd ed. 1898.

**Frankau, GILBERT** (b. 1884). British author. Born April 21, 1884, the son of Arthur and Julia Frankau, he



Gilbert Frankau,  
British author

Russell

was educated at Eton and spent some years in business before turning to literature. He travelled round the world, 1912-14, and in Oct., 1914, received a commission in the 9th E. Surrey regiment. In 1915 he transferred to the R.F.A., fighting at Loos, Ypres, and on the Somme. He was promoted staff captain for special duty in Italy, Oct., 1916, and in Feb., 1918, was invalided from the army. His publications include *One of Us*, 1912; *The Guns*, 1916; *The City of Fear*, 1917; *One of Them*, and *Peter Jackson, Cigar Merchant*, 1919; *Life—and Erica*, 1925.

**Frankau, JULIA.** British novelist, who wrote under the pseudonym of Frank Danby (*q.v.*).

**Frankenau, BATTLE OF.** Fought between the Germans and the Russians, Aug. 23-24, 1914. While the Russian army of the Niemen, under Rennenkampf, was advancing in Aug., 1914, into East Prussia from the N., the army of the Narev, led by Samsonoff, invaded that prov. from the S. by three routes. One was along the rly. from Warsaw to Malva and Soldau, on the opposite sides of the frontier; the second was by way of the rly. from Ossoweitz to Lyck; and the third lay across country to Lyck, whence Samsonoff struck S. of the Masurian Lakes to Johannisberg.

His advance was rapid. Soldau and Niedenburg were quickly in his hands, and he then captured Allenstein, the headquarters of the 20th German Army Corps, which had taken up a strong position between Frankenau and Orlau, N.W. of the Masurian Lakes. Samsonoff attacked it on Aug. 23, 1914, and heavy fighting continued all day without a decision. The frontal attacks of the Russians failed, but next day the German line was outflanked on its right, and this threat, coupled with a determined renewal of the frontal attacks, forced the enemy to retire hurriedly on Osterode. Samsonoff's cavalry advanced N., and came within a few miles of Königsberg and also of Rennenkampf's troops, seeming to promise an early occupation of E. Prussia. See Tannenberg, Battle of.

**Frankenberg.** Town of Germany, in Saxony. It stands on the Zschopau, an affluent of the Mulde, 32 m. S.W. of Dresden. It is a manufacturing centre, and among its products are cotton, woollens, and silk-stuffs. Its dyeworks, of more than local renown, languished somewhat in the 20th century. Pop. 13,576.

**Frankenhausen.** Town of Germany, in Schwarzburg-Rudolstadt (Thuringia). It stands on a branch of the Wipper at the foot of the Schlachtberg, 27 m. N. of Erfurt. It has extensive natural deposits and salt springs celebrated for the cure of rheumatic complaints, which are employed locally for thermal baths and exported for use as the basis of laxative salts. The buildings include a palace and a large secondary school. There is a local market for undressed wool, and several dye and glue works. Near here the rebellious peasants under Münzer were defeated in one of the last battles of the Peasants' War (1525). A cave in which Barbarossa, surrounded by his warriors, is said to sleep, is in the neighbourhood. Pop. 6,600.

**Frankeniaceae.** Small natural order of herbs and small shrubs. Natives of temperate and warm regions, they are chiefly seashore plants. They have jointed branches, small, opposite leaves, and small, solitary, regular flowers. The familiar sea heath (*Frankenia laevis*) of salt-marshes is a type of the order.

**Frankenstein.** Novel by Mary Wollstonecraft Shelley, first published anonymously in 1818, with the title Frankenstein, or the Modern Prometheus. It is the story of a man who succeeds in making a monster, and giving it life, and of the awful consequences. Frankenstein is the name of the man, not of the monster he creates.

**Frankenthal.** Town of Germany, in Bavaria. It stands on the Isenach, 7 m. S.W. of Worms. It received a charter of township in 1577. It has a communication by canal with the Rhine, 3½ m. distant. The place is distinguished by the width and regularity of its streets and its imposing public buildings, which include a handsome town hall. It has a considerable trade in wine and paper, linen and iron are manufactured, and its light beer is famous. Ironfounding and the manufacture of machinery, boilers, and toys are carried on. Pop. 18,779.

**Frankenwald.** North-western group of the Fichtelgebirge Mts. in Bavaria, situated between the rivers Saale and Main. The highest peak is the Döbraberg (2,605 ft.). See Fichtelgebirge.

**Frankfort.** City of Kentucky, U.S.A. It is capital of the state and the co. seat of Franklin co. On the Kentucky river, here spanned by a fine suspension bridge, 55 m. E. of Louisville, it is served by the Chesapeake and Ohio and other rlys. In addition to the capitol, there are several state buildings, including an arsenal, penitentiary, library, a home for feeble-minded children, and a coloured normal school. A busy trade centre, Frankfort manufactures lumber products, carriages, glass, tobacco, flour, and shoes. The city dates from 1786, and became the state capital in 1792. Pop. 11,180.

**Frankfort-on-Main.** City of Germany, called by the Germans Frankfurt. It stands on the Main,



Frankfort arms

the city proper being on the right or N. bank, 24 m. from its junction with the Rhine and in the Prussian province of Hesse-Nassau. On the left bank is Sachsenhausen, a suburb with a history, while the city also includes Bockenheim, until 1895 a separate municipality, and populous modern suburbs all around. The city's population is 350,000, about 32,000 being Jews, who have always been numerous.

The interest of Frankfort is in its buildings and historical associations on the one hand and in its banking and commercial interests on the other. It was, moreover, the birthplace of Goethe, while from it came the Rothschilds. In the centre of the old town, with its narrow streets, is the Römerberg or market place. The Zeil is the chief business street; the Markt contains the Goldene Wage, a 15th century house, and other historic buildings. Beyond the old town is the comparatively new town, begun in the 14th century. Beyond that are the Anlagen, or promenades, laid

out early in the 19th century when the city walls were pulled down.

Of the many churches, the cathedral was founded in the 9th century. Much of the present edifice dates from the 14th century, but it was thoroughly restored in the 19th century after a fire. In it the German kings were crowned after the pope ceased to perform that ceremony in Rome. Other churches are S. Leonard's, with two 13th century Romanesque towers; S. Nicholas; the church of Our Lady; S. Peter's, with a fine interior; S. Paul's, and several synagogues. The town hall, called the Römer, which stands on the Römerberg, consists of a number of old houses linked together



Frankfort-on-Main. The 14th century cathedral of S. Bartholomew, to which the tower was added in 1414

Other buildings include the Saalhof, which has a Romanesque chapel, the oldest edifice in Frankfort. The hall of the linen drapers still stands. The palace of the prince of Thurn and Taxis, where the federal parliament sat from 1816 to 1866, is now part of the post-office pile. The opera house is a magnificent building of the 19th century, while there are several theatres and many other places of amusement. The law courts is a fine modern building, and there is a new exchange or bourse and a fine central station.

Of the museums the chief is the Städel Institution in Sachsenhausen. This has some rare treasures, as well as a fine collection of paintings and antiquities. The linen drapers' hall houses the municipal museum of paintings and antiquities. Other museums are the Bethmann Museum and the museum of ethnology. The house of the Goethe family now contains relics of the poet and a large library of Goethe literature. The Rothschild house still stands, this being the only existing remains of the Jews' quarter. Another museum is named after J. C. Senckenberg, one of Frankfort's benefactors, who also founded a hospital and an almshouse.

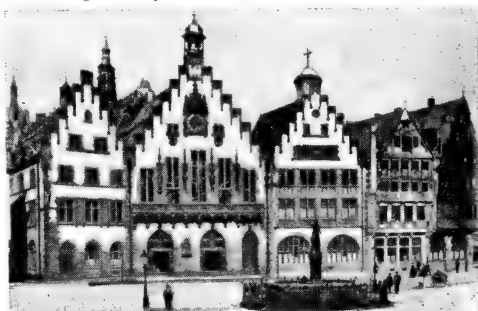
Several bridges cross the Main. The most notable is the old bridge



Frankfort-on-Main. The Central railway station

into one large building, to which modern additions have been made. In it are two historically interesting

apartments, the election chamber, where the electors met to choose the German king, and the Kaisersaal, where the coronation feast, described by Schiller, was held. The latter, now thoroughly restored, contains paintings of the emperors and kings.



Frankfort-on-Main. The Römer or town hall, containing the famous Kaisersaal



dating from the 14th century. On it are the mill, a statue of Charlemagne, and a crucifix crowned with a cock. The memorials include a fine one to Gutenberg and the early printers on the Rossmarkt, one to the Hessians who fell round the city in Dec., 1792, and one to Goethe on the Goethe Platz. The city has a zoological garden, and of its public grounds the finest is the palm garden. On the Römerberg is the Justitia Fountain dating from 1543 and restored in 1887. The Eschenheimer Tor, a gateway with a tower, is one of the few remains of the fortifications.

For centuries Frankfort has been a great commercial centre. It is now served by a network of railway lines, while the river adds to its facilities for transport. It has always been noted as a banking centre, while some of the earliest printing was done here. Two great fairs are held every year. Clothing, soap, chemicals, glass, leather, machinery, fancy goods, and other articles are manufactured in large quantities. There is a large trade in leather and other articles. Newspapers include the influential *Frankfurter Zeitung*.

Frankfort, the ford of the Franks, was a Roman and afterwards a Frankish settlement. Charlemagne and his successors, notably Louis the German, resided here and called here many of their diets. From the 12th century the German kings were elected here, and the Golden Bull of 1356 declared it to be the regular place for such elections. By this time it had taken a place among the free cities, and in the Reformation period the wealth and independence of the citizens were abundantly manifest.

The free city accepted the reformed teaching, joined the league of Schmalkalden, and was besieged by the forces of the emperor Charles V. The Swedes held it for a time during the Civil War. In 1806 Napoleon put an end to the privileges of the free city, but at the settlement of 1815 these were restored. It was the capital of a grand duchy (1810-14), the meeting place of the national parliament of 1848, and the seat of the diet of the German Confederation. In 1866 Frankfort fought on the side of Austria, and as the penalty of defeat was incorporated in the kingdom of Prussia. A university was founded here in 1914. Frankfort was several times bombed during the Great War and after its conclusion was occupied by the French April-May, 1920, during the temporary invasion of the Ruhr area by the German military party. They evacuated it, however, on

May 17, as soon as the number of German troops in the district had been reduced to that laid down by the treaty of Versailles.

**Frankfort-on-Oder.** Town of Germany, in the Prussian prov. of Brandenburg. It stands on the left bank of the Oder, with the suburb of Damm on the right. It is about 50 m. E. of Berlin. Of its old buildings the chief are the 13th century church dedicated to S. Mary, and the town hall. Its numerous more recent buildings give it the appearance of a modern city. Frankfort has manufactures of machinery, chemicals, etc., but its prosperity is chiefly due to its trade. It is a port on the Oder, and also a big rly. junction; Frankfort was settled by merchants from Franconia in the 13th century. It was then part of the electorate of Brandenburg, and for a time was a member of the Hanseatic League. Its situation has brought many sieges and sufferings upon it, and made it an important military centre before the Great War. From 1506 to 1811 there was a university here. Pop. 68,230.

**Frankfort Parliament.** Meeting of representatives of the German people at Frankfort-on-Main in 1848. In that year there was general unrest in Europe, and the idea of a closer union of the various German-speaking peoples was gaining strength. Certain prominent Germans met at Heidelberg and invited past and present members of the various diets and other important personages to meet at Frankfort. About 500 responded and made arrangements for calling an assembly that should be truly national and representative. It was agreed that each 50,000 persons should send one member chosen by universal suffrage. The diet of the German Confederation gave its assent, and, although the various governments were more or less hostile, the elections went through.

The parliament met on May 18, and after much discussion decided that for the present united Germany should be ruled by a regent who should choose his own ministers. The archduke John of Austria was elected to this office, and then the assembly began to discuss the fundamental laws of the proposed empire. Meanwhile Prussia and Denmark had come to blows; the parliament ordered the Prussians to withdraw from Schleswig, but had no power to enforce this decree. The quarrel became so acute that civil war broke out in the streets and further meetings were only possible owing to the protection given by Prussian soldiers.

Discredited but not yet destroyed, the parliament decided on the fundamental laws and then turned to constitutional matters. Here trouble arose over the position of Austria, with its large non-German population. The majority were against admitting them to the new union, but Austria protested, and an alternative proposal was accepted—that the whole of the Austrian empire should be excluded and its relations to the rest of Germany specially regulated. Austria again protested, but this time in vain, for the idea found strong support in Prussia. Eventually it was decided to offer the crown to a German prince, who should be called German emperor. Austria and Bavaria objected, but the counter plan of an imperial vicar, an Austrian and a Prussian to fill the place alternatively, was rejected, and the majority chose Frederick William IV of Prussia as head of united Germany, the honour to be hereditary in his house. Realizing the strong opposition, he refused it.

The parliament, however, struggled on and tried to work the new constitution, although Prussia, following the example of Austria, soon withdrew her representatives. Many others resigned in May, 1849, and the few that remained went to sit at Stuttgart until they were ejected, June 18, 1849. The idea of a united Germany failed owing to the impossibility of adjusting the rival claims of Austria and Prussia, a knot cut by the war of 1866. See Germany: History.

**Frankfurter Zeitung** (Frankfort Gazette). Founded in 1856 as the *Frankfurter Handelszeitung* (Trade Gazette) by Leopold Sonnemann, it became the first paper in the German empire in authority and influence, the leading financial organ, and on foreign affairs a mouthpiece of the foreign office in Berlin.

**Frankincense** (old Fr. *franc. encens*, true incense). Fragrant gum exuded from several trees of the genus *Boswellia*. It is abundant on the Somali coast and in South Arabia. A cut is made in the tree trunk, and the weeping resin coagulates in breast-shaped globules which are scraped off and shipped to Bombay. Here the commodity is graded and re-exported to the various markets.

The ceremonial religious use of frankincense is of great antiquity, having been practised by the Egyptians, Persians, Babylonians, and Assyrians; by the Jews as a constituent of the incense of the sanctuary (Ex. xxx, 34), and by the Greeks and Romans. It was

long employed in the East as an external application for tumours and sores, and, in China, as an internal remedy for leprosy and other diseases. See Incense.

**Franking** (Fr. *franc*, free). Free use of the postal service. To the extent of sending ten letters a day and receiving fifteen, it was a privilege granted to both the House of Lords and the House of Commons in 1764. With the introduction of penny postage in 1840 it was abolished, but letters are still franked by the public departments, and, if so franked, can be sent thereto free of charge. See Post Office.

**Frankland, Sir Edward** (1825-99). British chemist. He was born at Churchtown, Lancashire, Jan. 18,



Sir E. Frankland,  
British chemist

1825, and educated at Lancaster grammar school, Royal School of Mines, London, and the universities of Marburg and Giessen. In 1850 he discovered the zinc compounds of methyl and ethyl, and next year was appointed professor of chemistry at Owens College, Manchester.

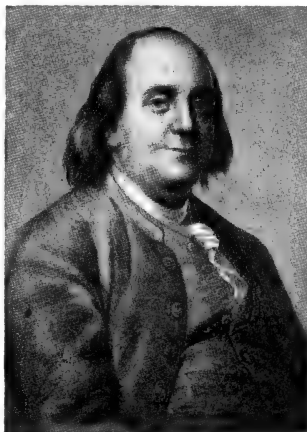
He was professor of chemistry at S. Bartholomew's hospital, London, 1857-63, and at the Royal Institution, 1863-67. His chief work was done as a member of the royal commission on the Pollution of Rivers, in a laboratory provided by the government. He died in Norway, Aug. 9, 1899.

**Franklin** (late Lat. *francus*, free). A freeman. The word was used in medieval England as a mark of distinction, though without any exact meaning. It seems to have referred primarily to a class of landholders between the noble and the more or less unfree; the country squires of a later day. Such doubtless was the franklin in The Canterbury Tales.

**Franklin, BATTLE OF.** Fought in the American Civil War (*q.v.*), Nov. 30, 1864. General Schofield, with 25,000 Federal troops, was retreating to Nashville, Tennessee, when, as he was crossing the Harpeth river at Franklin, he was attacked by a Confederate army of 40,000 men under Hood. At first thrown into confusion, the Federals rallied, and, after a furious resistance, Schofield succeeded in withdrawing his men across the river. In no battle of the Civil War was greater determination or resistance, shown on either side. The losses were very heavy; those

of the Federals being 2,326 killed, wounded, and missing, those of the Confederates more than 6,000.

**Franklin, BENJAMIN** (1706-90). American statesman and scientist. The son of an English immigrant, a tallow chandler, Benjamin Franklin was born at Boston, Mass., Jan. 17, 1706, and was apprenticed in 1719 to his eldest brother, a printer. He moved to Philadelphia in 1723, and while working there as a compositor attracted the attention of the governor of Pennsylvania, Sir William Keith (1680-1749), who encouraged him to go to England to buy printing materials wherewith to set up in business. Franklin accordingly made his way to London in 1725, but Keith's promises proved illusory and he had to take employment as a compositor. After a troubled eighteen months in London, he returned to Philadelphia, again as a printer's assistant.



*Benjamin Franklin*

After J. H. Duplessis

In 1729 he purchased a weekly journal, The Pennsylvania Gazette. Three years later he issued his Poor Richard's Almanack, which continued to appear for 25 years, and was widely popular for its wealth of prudent maxims on industry and thrift. He became postmaster of the city in 1737, clerk to the General Assembly from 1736-51, and a member from 1751-64, attracting notice by his scheme for intercolonial union at the Albany Convention, 1754.

Meanwhile Franklin had added scientific research to his many activities. About 1746 he began to investigate problems connected with electricity, his work leading

to the invention of the lightning conductor in 1749. Earthquakes, meteorology, stoves and chimneys, ocean currents and navigation were all among the many subjects of his inquiries during these years; his experiments with the pouring of oil on stormy water and with agricultural fertilisers showed the versatility of his mind.

In 1757 he once again crossed to England; this time as the agent of Pennsylvania in the colonial dispute with the Pennsylvanian proprietors. Franklin was widely welcomed, became known to many distinguished figures in political and literary life, and received degrees from the universities of Oxford, Edinburgh, and St. Andrews. In 1762 he went back to America, but 1764 found him again in London in his former capacity. In 1766 he gave evidence before the House of Commons which was largely instrumental in the repeal of the notorious Stamp Act. The unfortunate publication of certain letters entrusted to him for private circulation led to difficulties in London, and he returned to Philadelphia in the spring of 1775.

His old affection for the English connexion, weakened perhaps by this rebuff, turned into an active sympathy with the separatist policy. He was one of the five members commissioned to draft the Declaration of Independence in 1776, and in that year he went to Paris as commissioner for the colonies. He negotiated the alliance between America and France, and was then appointed plenipotentiary in Paris, where he remained throughout the war, negotiating the treaty of peace finally signed in 1783. He returned to America in 1785 and took some part in framing the new constitution of the United States, retiring from public life in 1788. He died at Philadelphia, April 17, 1790.

J. E. Miles

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**Franklin, Sir John** (1786-1847). British explorer. Born at Spilsby, Lincolnshire, April 16, 1786, and educated at Louth grammar school, he entered the navy as a midshipman in 1801, being present at the battle of Copenhagen. He distinguished himself in the service

and took part, between 1818 and 1827, in three Arctic expeditions, during which he surveyed many



*John Franklin*

thousand miles of Arctic-American coast-line and the Saskatchewan, Coppermine and Mackenzie river basins. For these services he was promoted captain, knighted, 1829, and awarded various scientific distinctions at home and abroad. From 1836-43 he was governor of Van Dieman's Land (Tasmania).

A new British expedition, consisting of the ships Erebus and Terror, with Franklin in command, intended to explore the N.W. Passage, sailed from the Thames on May 19, 1845. The vessels were last sighted in Baffin Bay. Franklin had proposed to return in 1847, and, no tidings being received from him, no fewer than 39 expeditions, four at Lady Franklin's expense, were sent forth from Great Britain and America between 1847 and 1857, in hope of rescuing the explorers. Some traces of them were found by Captains Ommanney and Penny, and Dr. Rae. In 1857 Lady Franklin equipped the yacht Fox and dispatched it to N.E. America under Captain, afterwards Sir, Leopold McClintock. Two years were spent in search, and in June, 1859, a cairn was found at Point Victory in which was a record of Franklin's expedition down to April 25, 1848, with definite proof that he had discovered the N.W. Passage, and that he had died on June 11, 1847. Parliament voted £2,000 for the statue in Waterloo Place, London, and Lady Franklin erected the monument in Westminster Abbey. See Arctic Exploration.

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**Franklinite.** Sometimes considered an ore of zinc, but more properly an ore of iron. Its normal composition is peroxide of iron, 67 p.c.; sesquioxide of manganese, 16 p.c.; oxide of zinc, 17 p.c. It

occurs in coarse, granular, massive form and in brilliant crystals frequently of large size. It is brittle and slightly magnetic, but blacker than magnetic iron ore, which it resembles. First recognized in deposits near the Franklin furnace at Hamburg, New Jersey, it is used in the manufacture of Bessemer steel.

**Frank-marriage.** In English law, a form of entailing land, now obsolete. It referred to land granted by a man to his daughter and her husband. This was free or franked from the usual feudal dues, except that of fealty, and so remained until the holder was removed more than four degrees of relationship from the overlord. See Land Laws.

**Frankpledge.** System by which a group of men were held responsible by the state for each other's misdeeds. The Anglo-Saxons called these associations *frithborhs*, and membership was imposed by law upon all freemen. William the Conqueror ordered every freeman to be in a frankpledge, which appears to have consisted of ten or twelve men, and later kings made like regulations. Sheriffs held periodical "views" of frankpledge, i.e. courts to see that the law was being obeyed. After a time the unfree were admitted to membership, and the free dropped gradually out. The system was by then, say the 14th century, showing signs of decay, and it did not survive the advent of the Tudors, although courts for the view of frankpledge remained for some time longer, and in manorial court leets have one or two survivals to-day. See Jury.

**Franks** (late Lat. *francus*, free). Group of tribes dwelling in Europe in the 3rd century, who founded the kingdom of France, to which they gave their name. They are first mentioned in writing in reference to a victory obtained by Aurelian over some of them near Mogontiacum (Mainz) in 241.

The Frankish tribes were of Teutonic origin and were first found in what is now N.W. Germany and the Netherlands. They bore various names until by one of the accidents of history that of Franks began to prevail over the others and gradually supplanted them.

In the 4th century or a little later the Franks were divided into two main branches: the Salian Franks around the mouth of the Rhine and the Riparian Franks higher up the river. They were first enemies and then tributaries of the Romans, and the decay of the Roman empire was their hour. The man to use it was Clovis,

descendant of one Chlodio, who had led the Salian Franks into what is now France and had made Tournai his capital. Thirty years before he became king in 481 his tribe had sent warriors to that vast host that defeated the Huns in 451.

Clovis united many of the Salian Franks under his rule, and conquered much of Gaul. He made the Riparians, who had spread up the Rhine as far as Alsace, own his authority, and when their own king was murdered they took the Salian in his stead. Clovis was baptized as a Christian, and nominally at least the Franks were no longer pagans. His sons continued his career of conquest, and soon Frankland was a great district lying on both sides of the Rhine, the name being perpetuated in the German district of Franconia. Like Anglo-Saxon England, it was divided into more or less independent kingdoms, such as Austrasia and Neustria, but, in spite of civil wars, there was a certain brotherhood between them which facilitated the combination of several into one.

This union of Frankish tribes under Clovis and his descendants formed that Frankish realm which has so greatly influenced European history. It existed in one form or another from about 500 to about 900, reached its height in the great but transient empire of Charlemagne, and from its ruins both France and Germany arose. It included parts of both, but soon a cleavage showed itself between E. and W. Franks, and early in the 9th century the one folk could not understand the speech of the other.

A definite division was made in 817 and soon afterwards the E. Franks became Germans and the W. Franks became French. The boundary between them was not easily drawn; indeed, it may be said to have been a prime cause of a thousand years of intermittent European warfare. France added Celtic elements from the S. and W. to her Franks; Germany added Slavonic ones from the E. to hers, and for this and other reasons the two developed into distinct nations.

Gregory of Tours, the chief authority for the early history of the Franks, and other writers, describe the customs and habits of these people in peace and war, which do not seem to have differed very much from those of other Teutonic tribes. See France.

**Franks, SIR AUGUSTUS WOLLASTON** (1826-97). British antiquary. Born at Geneva, March 20, 1826, he was educated at Eton and Trinity College, Cambridge. After being assistant in the department

of antiquities in the British Museum, he became keeper of medieval antiquities and ethnography, 1866. He was fellow, 1853, director, 1858-67, 1873-80, and president, 1891-97, of the Society of Antiquaries, was made F.R.S., 1874, and K.C.B., 1894. He applied large private means to purchasing porcelain and other objects of Oriental and medieval art, and enlarging the Henry Christy ethnographical collection. His own acquisitions were mostly presented or bequeathed to the British Museum. He died in London, May 21, 1897.

**Frantz, KONSTANTIN** (1817-91). German publicist. From 1852-56 he was in the Prussian diplomatic service, but he retired in the latter year and turned his attention to the study of sociology and political economy. He advocated a union of the Central European powers against the rest of the world, and considered the future of the world to rest largely with Germany. His principal works are *Der Federalismus als das leitende Princip für die soziale, staatliche und internationale Organisation*, 1879; *Die Welt-politik*, 1882-83; and a contribution to Schuchardt's *Die Deutsche Politik der Zukunft*, 1899.

**Franzen, FRANS MIKAEL** (1772-1847). Swedish poet. Born at Uleåborg, Finland, Feb. 9, 1772, and educated at Åbo University, where he was later a professor of history, he left Finland in 1811, after the country had passed into the hands of Russia. He was for many years rector of a parish in Stockholm, and in 1834 was made bishop of Hernösand. He was one of the most widely appreciated of Swedish hymn-writers, and his ode to Count C. P. Creutz, the Finnish poet, was crowned by the Swedish Academy. He died Aug. 14, 1847.

**Franzensfeste.** An old fortress, one of a line of fortifications constructed to defend the Austrian frontier in Tirol. It commanded the railway line which passes between Innsbruck and the Brenner Pass and through the valley of the Puster to Klagenfurt.

**Franz Josef.** Glacier in the Southern Alps of New Zealand. It flows to within 600 ft. of sea level and discharges into the Waiho river only 15 m. from the sea. It is 8½ m. long.

**Franz Josef Land.** Archipelago in the Arctic Ocean, lying N. of Novaia Zemlia and N.E. of Spitsbergen in lat. 80° to 82° N. and long. 42° to 64° E. The archipelago consists of about 100 small islands, the chief of which are Graham Bell Land, Wilczek Land, McClintock Island, Alexandra Land and Crown Prince Rudolf Land.

They are mountainous, of volcanic origin, and largely glacier-covered; but on the shores and other favoured spots, mosses, poppies, saxifrages and other Arctic plants grow. The loftiest point rises to 2,800 ft. Bears, walrus, seals, foxes, and a large variety of birds inhabit the islands.

Discovered by the Austrian explorers, Payer and Weyprecht, in 1872-73, the islands were further explored by Leigh Smith in 1881-82, the Jackson-Harmsworth expedition in 1895-96, and by the duke of Abruzzi's expedition in 1899-1900. The sea on the N. is called Queen Victoria Sea; the wide opening S. of it is known as the British Channel, and its westernmost point is Cape Mary Harmsworth. The islands are uninhabited.

**Franzos, KARL EMIL** (1848-1904). German novelist. He was born, the son of a Jewish doctor, in Podolia, Oct. 25, 1848. Having educated himself, he entered the legal profession, but left it for journalism. After living for some years in Vienna, he settled in Berlin, where he founded, in 1886, the fortnightly review, *Deutsche Dichtung*. His many works of fiction deal largely with the Jewish life of the country of his upbringing, and abound with pathetic incidents. Notable among his novels are *The Jews of Barnow*, 1877, Eng. trans. 1882; *For the Right*, 1882, Eng. trans. 1887; and *Der Präsident*, 1884, Eng. trans., *The Chief Justice*, 1890. In his *Aus Halb-Asien*, 1876, are many sketches of life in S. Russia and Rumania. He died Jan. 28, 1904.

**Frascati.** City and summer resort of Italy. In the prov. of Rome, it stands on the slopes of a wooded hill, at an elevation of about 1,000 ft., 15 m. by rly. S.E. of Rome. The cathedral, founded in 1700, contains a tablet to the

Young Pretender, interred here in 1788. Among the many magnificent residences are the villas Aldobrandini, Ruffinella, Torlonia, Lancelotti and Borghese. In the neighbourhood are the remains of numerous ancient villas, an amphitheatre, a theatre, and a reservoir belonging to the town of Tusculum, which was destroyed in 1191. Between the ruins of the

ancient city and Frascati, the villa of Cicero once stood, and on its site some monks in the 11th century built a convent. Frascati is famous for its wine. Pop. 10,577.

**Fraser.** River of Canada, in the prov. of British Columbia. Rising in the Yellowhead Pass in two branches, it flows N.W. for the first 160 m. of its 800 m. course; it then takes a hairpin bend round the head of the Cariboo Mts., receiving the waters of the Nechaco at Fort George, and flows almost due S. until it reaches Hope, after which it flows W. to its outlet in the Strait of Georgia at New Westminster. Important tributaries are the Thompson, Stuart, Nechaco, Chilcotin, Bridge, and Blackwater; among the lakes drained are the Stuart, Fraser, François, and Quesnel. It is notable for the salmon fisheries and hatcheries. It is navigable for only 80 m. from its mouth. The area of the basin is 138,000 sq. m.

**Fraser.** Name of a famous Scottish family. It is supposed to be a corruption of Frisel and to be of Norman origin. Early Frasers settled in the south of Scotland in the 12th century, but soon they moved northwards and established themselves in the shires of Inverness and Aberdeen. They became very numerous, being one of the most powerful of the Scottish clans. Among the places owned by the Frasers was Lovat, and one of them, Hugh Fraser, was made Lord Lovat about 1430. He was a grandson of Sir Simon Fraser, sheriff of Tweeddale, and from him are descended the later lords Lovat and a number of other branches of Frasers. Another branch of Frasers is now represented by Lord Saltoun, whose family name is commemorated in Fraserburgh. See Lovat, Lord; Saltoun, Lord.

**Fraser, JAMES** (1818-85). British prelate. Born at Prestbury, Gloucestershire, Aug. 18, 1818, the



Frascati, Italy. Colonnade and cascade in the gardens of the Villa Aldobrandini

son of a merchant, he was educated at Shrewsbury School and Lincoln College, Oxford.



James Fraser,  
British divine

His scholarship won for him a fellowship at Oriel, and having served for a time as tutor there, he was ordained in 1846. He held livings in Wiltshire and Berkshire, and was chancellor of Salisbury. In 1870 he was chosen bishop of Manchester, and he worked in that diocese until his death there on Oct. 22, 1885.

He was the real founder of the diocesan organization, was chosen as arbitrator in several industrial disputes, and was unwillingly the defendant in a case arising out of ritualistic practice. Specially interested in education, Fraser had studied this subject thoroughly as an assistant commissioner in the diocese of Salisbury, and in 1868 he had reported in an official capacity on education in Canada and the U.S.A. See Memoir, T. Hughes, 1887; Lancashire Life of Bishop Fraser, J. W. Diggle, 4th ed., 1890.

**Fraserburgh.** Village of the Cape Province. It is 84 m. N.W. of Fraserburgh Road, a station on the rly. from Cape Town to De Aar, and is a sheep-farming centre. Pop. 800.

**Fraserburgh.** Police burgh, seaport and fishing town of Aberdeenshire, Scotland. It stands on the W. shore of Fraserburgh Bay, and on the S. side of Kinnaird's Head, 47 m. N. of Aberdeen, on the G.N.S.R. It is the chief centre of the Scottish herring fishery, and exports agricultural produce and imports coal. It has a large and good harbour, with piers and a breakwater. There are remains of the castle of the Frasers, while the town cross is worthy of notice. The town was named from Sir Alexander Fraser, who, in 1613, made it into a burgh. He also obtained permission to found a university here, and the buildings were begun, a tower erected for this purpose still standing. The Council owns the gas and water works, an isolation hospital, public abattoir and a free library. Market day, Tues. Pop. 10,574.

**Fraserville.** Town and watering place of Quebec, Canada, known also as Rivière du Loup. In Temiscouata co., it stands on the Rivière du Loup, near the junction of that river with the S. Lawrence, 110 m. N.E. of Quebec.

Here are the Fraser Institute, churches, schools, etc. The town is on the Inter-colonial Rly. and is the terminus of the Temiscouata Rly. Its industries include pulp mills, and the making of furniture, bricks, etc. The town is also a pleasure resort, trout fishing and caribou hunting being attractions for sportsmen, while steamers call here. Pop. 6,774.

**Fratricelli** (dim. of Ital. *frate*, brother). Group of religious orders in medieval Italy. Originating in the Franciscan order in the 13th century, when the more zealous members of that order discontinued the possession of money or property, it took a powerful hold on the popular imagination and gained many recruits. Carried away by their zeal, they regarded themselves as the true representatives of the Catholic church and elected popes, thereby bringing upon themselves the heavy hand of the Inquisition. Persecutions increased until 1449, when the constant imprisonments and executions deprived them gradually of their leaders, and the Fratricelli died out. See Hist. of the Inquisition of the Middle Ages, H. C. Lea, vols. ii and iii, repr. 1906.

**Fratricide** (Lat. *frater*, brother; *caedere*, to kill). Killing a brother or sister. In English law it is on the same footing as any other homicide, but in some ancient systems was a special species of crime, punishable more severely than killing a stranger in blood. See Murder.

**Fratta Maggiore.** Town of Italy, in the prov. of Naples. It is 8½ m. N. of Naples, and is a favourite residential district of wealthy Neapolitans. The vineyards in the neighbourhood produce an excellent wine, silkworms are reared, and rope made. Pop. 13,720.

**Fratton.** District within the borough of Portsmouth. It has a station of the L.B. & S.C. and L. & S.W. Rlys., known as Fratton and Southsea. See Portsmouth.

**Fraud** (Lat. *fraus*, deceit). English law term, for which no comprehensive definition exists. The essence of the matter is deceit—some statement or suppression of fact in word or deed with intent to deceive. When a man sues on the ground of fraud, or claims property fraudently withheld from him, his right of action begins to accrue from the time he discovers the fraud, and not from the time it was perpetrated upon him. Some frauds are criminal, but not all. But a conspiracy to defraud is always criminal. If a person has been induced to enter into a contract, or to transfer property by fraud, he can always, on discovering it, have

the contract or transfer set aside; but he must be careful to take steps immediately. And he cannot recover his property as against some innocent purchaser who has bought it without notice of the fraud.

**Frauds, STATUTE OF.** English law passed in 1676. Its design was to substitute written for verbal evidence in large classes of transactions, and so diminish liability to fraud and perjury. Conveyances, wills and leases of land, except tenancies of less than three years, were required to be in writing and signed by the party or his agent. It was also enacted that no action should be brought upon certain agreements unless the plaintiff could prove the agreement by writing duly signed by the defendant or his agent.

These agreements were: (1) A promise by an executor or administrator to pay the deceased's debt or damages out of his own pocket; (2) a guarantee; (3) an agreement in consideration of marriage; (4) a contract, sale of lands, or tenements or hereditaments, or any interest in or concerning them; (5) an agreement not to be performed within a year from the making thereof. As to (3) it was soon held not to include a promise to marry; the consideration for which is not marriage, but a promise to marry by the other party. The section dealing with contracts for the sale of goods of the value of £10 and upwards has been repealed and almost re-enacted by the Sale of Goods Act, 1893; and other sections, which made writing necessary for a will of lands, have also been repealed, and the subject of wills generally dealt with by the Wills Act, 1837.

The statute and its policy have led to much litigation and difference of opinion. No doubt it was advisable to make written instruments and evidence compulsory, at any rate for wills, guarantees, leases and conveyances of land. It is questionable whether it was politic, having regard to mercantile usages, to include sales of goods within the purview of such a statute. Yet, as we have seen, this very section has been re-enacted in modern times. It may be said, however, that in the Commercial Court the defence is very rarely set up that the contract is not evidenced by writing.

**Frauenburg.** City and port of E. Prussia, Germany. It stands where the Bande falls into the Frisches Haff, in the district of Königsberg, by rly. 42 m. S.W. of Königsberg. Its interest is in its Gothic cathedral and its associations. This, the cathedral of the



bishops of Ermeland, was built in the 14th century, and has a fine W. front. Copernicus was a canon here when he died in 1543. Pop. 2,522.

**Frauenfeld.** Town of Switzerland, capital of the canton of Thurgau. It stands on an eminence overlooking the river Murg, near its confluence with the Thur, 26 m. by rly. N.E. of Zürich. Its old castle has a 10th century keep, and its parish church dates from the 13th century. A prosperous town, it has iron industries, manufactures of machinery, firearms, leather, cotton fabrics, and gloves, besides a thriving trade in farm products, wine, and fruit. From 1712-98 it was the capital of Switzerland, and its abbot retained manorial rights until 1803. The town was in the hands of the French and Austrians in 1799. The inhabitants are German-speaking and largely Protestants. Pop. 8,105.

**Frauenlob.** Nickname by which Heinrich von Meissen (c. 1250-1318), German poet, came to be known. He is sometimes described as a minnesinger, and also as the founder of the Meistersingers at Mainz. He died at Mainz, and was carried to the grave by women of that city. He is supposed to have been called Frauenlob (praise of women) from his using the word *Frau* for woman rather than *Weib*.

**Fraunhofer,** JOSEPH VON (1787-1826). German optician and physicist. Born at Straubing in Bavaria, the son of a glazier, he was apprenticed to a glass polisher, and eventually set up for himself as a maker and polisher of achromatic lenses. While working at this craft, at which he attained great skill, he taught himself mathematics and optics. In 1806 Fraunhofer was appointed optician in the mathematical institute at Munich, and later became the manager of another such institute, which he had helped to found. He died there, June 7, 1826.

Fraunhofer was responsible for great advances in the manufacture of lenses for telescopes and microscopes, while at the same time by his invention of the diffraction grating he opened up a new and fertile field of development for theoretical optics. But the discovery that has immortalised the name of Fraunhofer was that of the Fraunhofer lines. These lines had previously been noted by the English physicist Wollaston, but Fraunhofer not only discovered them independently, but studied them deeply, mapping several hundreds of them, and assigning to the seven most prominent lines the letters A to G, by which they are still known. He also mapped the

lines which he found in the spectra of several of the fixed stars, and from the fact that in no two cases were the lines exactly the same, he concluded that they must correspond to some definite property of the sun or star, and that they were not due merely to the effect of the earth's atmosphere. Fraunhofer thus became the founder of the science of spectroscopy (*q.v.*).

**Fraunhofer Lines.** Lines discovered by Fraunhofer. When a beam of sunlight that has been admitted through a thin slit is passed through a prism, so as to be drawn out into a spectrum, and this spectrum is examined through a telescope, it is found to be crossed by a multitude of dark lines. Careful investigation has revealed the existence of some 10,000 lines in place of the 600 originally counted. The position of each line corresponds to a definite angle of refraction of the light, and thus to a definite wave-length, and the presence of any given dark line implies that light of that wave-length has failed to reach us. The reason for this failure in many cases is the absorption of a particular wave-length by some element in the sun's atmosphere.

It was established by the physicist Kirchhoff that the characteristic wave-lengths of light which an element gives out when heated to incandescence are just those which it absorbs when cooler. For example, the flame of burning sodium examined through a spectroscope shows a bright double line, which corresponds in position to the dark double line in the solar spectrum known as the "D" line. The presence of the "D" line in the solar spectrum thus indicates the existence of sodium vapour in the sun's atmosphere. See Spectroscopy.

**Fraustadt** (Polish, Wszowa). Town of Poland. It is 14 m. N.E. of Glogau, formerly in Prussian Poland. It is an important commercial centre where, sugar refining, tanning, dyeing, and milling are carried on, and the nucleus of a mining district. A feature of the landscape is the number of windmills. Fraustadt is divided into a new and an old town. In the vicinity King Augustus of Poland was defeated by Charles XII of Sweden (Feb. 13, 1706).

**Fray Bentos.** River port of Uruguay and capital of the dept. of Rio Negro. It stands on the Uruguay river, 172 m. direct N.W. of Montevideo. It is a pleasant modern town, laid out in 1859, with wide thoroughfares and fine public buildings and abattoirs. In the centre of a stock-raising dis-

trict, it has a large export trade in extract of meat and animal products, and contains the chief factory of the Liebig Extract of Meat Co. Pop. 10,000. Its official name is Independencia.

**Frazer** or GREAT SANDY. Island off the E. coast of Queensland, Australia. It lies between Hervey and Wide bays, is barren, but has excellent fishing.

**Frazer,** SIR JAMES GEORGE (b. 1854). British anthropologist. Born in Glasgow, he was educated privately and early devoted himself to researches into the social institutions, mythology and folklore of mankind in all ages. His main work is embodied in *The Golden Bough*, first published in 1890, of which revised and expanded editions have since appeared. It forms the most complete work on comparative religion yet written. His other books include *Studies in the History of Oriental Religion*, 1906; *The Scope of Social Anthropology*, 1908; *Totemism and Exogamy*, 1910; and *Folklore in the Old Testament*, 1918. He translated Pausanias's *Description of Greece*, 1898; and edited Addison's *Essays*, 1915. Long a fellow of Trinity College, Cambridge, he was made professor of social anthropology, Liverpool, 1907, in 1914 was knighted, and made O.M., 1925.

**F.R.C.O.** Abbrev. for Fellow of the Royal College of Organists.

**F.R.C.P.** Abbrev. for Fellow of the Royal College of Physicians.

**F.R.C.P.E.** Abbrev. for Fellow of the Royal College of Physicians, Edinburgh.

**F.R.C.P.I.** Abbrev. for Fellow of the Royal College of Physicians, Ireland.

**F.R.C.S.** Abbrev. for Fellow of the Royal College of Surgeons.

**F.R.C.S.E.** Abbrev. for Fellow of the Royal College of Surgeons, Edinburgh.

**Fréchette,** LOUIS HONORÉ (1839-1908). French-Canadian poet. He was born at Lévis, Quebec, Nov. 16, 1839, studied for the law and became a member of the Dominion Parliament in 1874. He was a busy journalist, and wrote several prose works, including *Christmas in French Canada*, 1899; but his reputation rests chiefly on his poems, *Mes Loirs*, 1863; *La Voix d'un Exilé*, 1869; *Pêle-Mêle*, 1877; *Les Oiseaux de Neige*, 1879; *Les Oubliés*, 1886; *Poésies Canadiennes*; and *Feuilles Volantes*, 1891. He died June 1, 1908.

**Freckles.** Rounded or irregular spots of yellowish or brownish pigment in the deeper layers of the epidermis, most common in fair and red-haired persons. Freckles

are permanent in some people, but in many they appear in the summer months, following exposure to sun, and disappear in the winter. Persons desirous of avoiding the condition should wear veils in strong sunshine. Freckles may be removed or lessened by application of a dilute solution of perchloride of mercury, but only under medical advice.

**Fredegond** OR **FREDEGUNDE** (d. 597). Frankish queen. Of humble birth, she attracted the attention of Chilperic I of Neustria, who murdered his wife, probably at her instigation, in order to marry her. A forceful character, she dominated her husband, had his sons murdered in order to make a future for her own boy, and carried on a relentless feud with Brunhild, queen of Austrasia. In 584 Chilperic died, murdered probably by his faithless wife, who became the ruler of Neustria in the name of her younger son, Clothaire II. By wars she had added something to its area when she died in 597.

**Frederic**, **HAROLD** (1856-98). American novelist and journalist. Born Aug. 19, 1856, he became a journalist, and was London correspondent of *The New York Times* from 1884 till his death, Oct. 19, 1898. His fame rests chiefly on his novel, *Illumination*, 1896 (published in America as *The Damnation of Theron Ware*), a keenly analytical study of American religious life as seen by an agnostic and a Roman Catholic priest. Other works are *The Copperhead*, 1894; and *March Hares*, 1896.

**Fredericia**. Seaport of Denmark, in the S.E. of Jutland. It stands on the Little Belt, at its N.W. entrance, 14 m. N.E. of Kolding, and is connected with that town and Esbjerg by rly., and with Middelfart in Funen by steam ferry. It manufactures cotton goods, hats, tobacco, and chicory, and exports eggs, meat, and fish.

Founded in 1652 by Frederick III, Fredericia was destroyed by the Swedes in 1657; re-fortified in 1709, it was besieged in 1848-49 and 1864, when it was again partly destroyed. A statue commemorates the Danish victory over the Slesvig-Holstein army in 1849. Pop. 14,228.

**Frederick**. City of Maryland, U.S.A., the co. seat of Frederick co. It is 46 m. N.W. of Washington, and is served by the Pennsylvania

and the Baltimore and Ohio Rlys. It contains a state school for deaf mutes, a women's college, and its industrial establishments include canneries, brush, leather, and tobacco factories, foundries and planing mills. It was settled in 1745, and incorporated in 1817. Pop. 11,225.

**Frederick**. Christian name of Teutonic origin. It means rich in peace, and Friedrich, the German form, has been long a favourite name in Germany, borne by many rulers. From Germany it passed into England in the time of the Georges, although similar names, formed from the Anglo-Saxon *frith*, peace, had been in use in early times, e.g. Frideswide. The Italian form is Federigo.

**Frederick I** (c. 1124-90). German king and Roman emperor, known from the redness of his beard as Barbarossa. Son of the duke of Swabia, nephew of the German king Conrad III, and a member of the family of Hohenstaufen, Frederick became duke of Swabia in 1147 and was chosen king on his uncle's death in 1152. Three years later he was crowned emperor by the pope at Rome. His empire included Germany and parts of Italy; the kings of Poland, Bohemia, and Hungary at one time or another recognized him as their superior; and by his marriage he added Franche Comté to the lands

inherited from his father and uncle. In Germany Frederick showed himself a strong and able ruler. He

would tolerate no rival to his own power, and easily crushed the rebellions engineered by turbulent princes. The duke of Bavaria was humiliated, and so, in 1181, was the powerful duke of Saxony, Henry the Lion, his duchy being broken up and he himself sent into exile. A little later the pope instigated some of the German prelates to rebel, but again the emperor was too strong for them.

**Frederick I**, German king, from a relief at Reichenhall, Bavaria

The eventful years of Frederick's life, however, were spent in Italy, where he came into conflict with the rich cities of Lombardy. In 1158 began his long quarrel with Pope Alexander III. In 1160 the emperor was excommunicated,



**Harold Frederic**, American novelist



**Frederick I**. The delegates of the Doge and Pope Alexander III appearing before Frederick Barbarossa to resist his claims. From the picture in the ducal palace, Venice

but he set up one anti-pope after another, and once entered Rome with an army and secured the coronation of his nominee. This success, however, was transitory, and soon his army was destroyed and he himself became a fugitive. To cow the cities he placed his own officials therein, and in 1162 stormed and humiliated Milan, but a few years later came the central disaster of his reign. The cities formed against him the Lombard League, an association blessed by the pope, and on May 29, 1176, the rival armies met at Legnano.

Frederick was totally defeated and fled from the field, after which no alternative was left to him but to sue for peace. A truce with the league became permanent a few years later, and in 1177 he signed the treaty of Venice with Alexander III. He had various disputes with Alexander's successors, but his power in Italy was never the same again. In 1189 he set out on a crusade, and on June 10, 1190, was accidentally drowned in a river in Cilicia.

Frederick was a commanding personality with marked ability and generous instincts, fearless, just, and devout, and his memory was long cherished by the Germans. But his reign was unfortunate for the Empire, and his costly campaigns in Italy did much to reduce it to impotence. *See* Empire; Papacy.

A. W. Holland

**Frederick II** (1194-1250). German king and Roman emperor. Son of the emperor Henry VI and grandson of Frederick I, Frederick was born in Italy, Dec. 26, 1194, heir to the splendid Hohenstaufen inheritance and to that of his mother, Constance, the heiress of Sicily. Educated with more than usual care, his varied abilities earned for him the designation of *stupor mundi*, the wonder of the world. In 1196 he was chosen German king, and when his father died two years later he became king of Sicily and a ward of Pope Innocent III.

In 1212, following an invitation from some of the princes, Frederick left Italy to supplant Otto IV in Germany, and was there crowned king by his partisans. After six years the old struggle between Welf and Hohenstaufen ended in his favour with Otto's death in 1218. In 1220 he was crowned emperor at Rome, and after spending some years in governing Sicily and fighting in Italy he tardily fulfilled his promise to go on crusade. In 1228 he reached the Holy Land, and, having already taken the title of king of Jerusalem, was crowned there as

soon as he had obtained possession of the city and its neighbourhood. Returning to Europe, Frederick



Frederick II. The emperor's seal as king of Jerusalem

was faced again with the hostility of the pope. Beginning soon after 1214, this was due chiefly to the emperor's evident intention of uniting Sicily and Germany, a course strongly resented by the papal court. Frederick was strong enough to force the peace of San Germano on Gregory IX in 1230, after which he brought Sicily completely under his personal rule. In Germany he pursued a contrary policy, for there, by the privilege of Worms, 1231, he gave the princes a charter of independence.

The concluding years of Frederick's reign were sad and unfortunate, not unlike those of Henry II of England. In 1231, and again somewhat later, his eldest son Henry had revolted; these risings were easily suppressed, and his second son, Conrad, was named as his successor. About 1239, however, began his last and greatest quarrel with the papacy. Excommunication he faced with a smile of contempt, but it was more serious when the pope allied himself with the Lombards and worked upon the turbulent princes of Germany. War broke out both in Germany and Italy. In the former anti-kings were found and crowned; in the latter the emperor's troops were utterly routed at Parma in 1248. Struggling to the last against a ring of foes, Frederick died at Fiorentino, Dec. 13, 1250. His splendid tomb is in the cathedral at Palermo.

Frederick was thrice married. His second wife was Yolande, the heiress of Jerusalem, and his third was Isabella, a daughter of John of England. Besides his lawful children, he had several illegitimate ones, notably Enzo, king of Sardinia, and Manfred. The emperor, who wore six crowns, made a great impression on his age; his court in Sicily was an intellectual

centre; in religious affairs he was tolerant, and in most other matters also in advance of his age. *See* Hist. of Frederick II, Emperor of the Romans, T. L. Kingston-Oliphant, 1862; *Stupor Mundi, Life and Times of Frederick II*, L. Allshorn, 1912. A. W. Holland

**Frederick III** (1415-93). German king and Roman emperor. A prince of the house of Hapsburg, Frederick was chosen German king in 1440, and was nominal ruler of the country for over 50 years. He was lethargic and indifferent, and under him the Empire lost what power and prestige it had retained. His feeble attempts to secure the kingdom of Hungary and Bohemia failed, and he was for a time deprived of Austria, and was unable to check the Turkish inroads. For some time before his death, on Aug. 19, 1493, he had ceased to take any part in the government of the country, which he left to his son Maximilian I, he himself being immersed in study and contemplation of the future greatness of his family. Frederick was the last emperor to be crowned in Rome, 1452.

Another and earlier German king is sometimes called Frederick III. A son of King Albert I, he was a Hapsburg. In 1314 a minority of the electors chose him as German king, and at once he was involved in war with the other king, Louis of Bavaria. He was defeated and taken prisoner, being released on acknowledging his rival. On this account he is not usually reckoned in the succession of German kings. He died Jan. 13, 1330. *See* Louis IV.

**Frederick** (1831-88). German emperor. Son of the emperor William I, he was born at Potsdam, Oct. 18, 1831. After studying at Bonn he travelled, and in 1855 was betrothed to Victoria, princess royal of England, whom he married in 1858. In politics he strongly opposed Bismarck. In the Austrian war, 1866, he commanded an army at Sadowa. In command of an army in the war of 1870, he fought at Wörth and Sedan, and took part in the siege of Paris.

Frederick was a strong advocate for the establishment of the German Empire, though his ideals differed considerably from those of Bismarck. The Liberal party hoped great things when he came to the throne, but he was attacked by cancer of the throat, and was obliged to go to Nice in 1887. On



Frederick, German emperor

the death of his father in March, 1888, he succeeded to the throne, which he had only occupied for ninety-nine days when he died at Potsdam, June 15, 1888. He was succeeded by his son William II. His family consisted of two sons and four daughters. The former were William II and Prince Henry of Prussia; the latter were Charlotte, the wife of Albert, duke of Saxe-Meiningen; Victoria, the wife of Adolf, prince of Schaumburg-Lippe; Sophia, wife of Constantine, king of Greece; and Margaret, wife of Prince Frederick Charles of Hesse. He is sometimes known as Frederick III because he is the third Frederick among the Prussian kings. *See* Frederick, Crown Prince and Emperor, R. Rood, 1888, and Life of Emperor Frederick, S. Whitman, 1901.

**Frederick.** Name of eight kings of Denmark. Several of them were comparatively unimportant personages, but the more important are noticed separately below.

**Frederick III** (1609–70). King of Denmark and Norway. Second son of Christian IV, he succeeded his father in 1648, having previously been bishop of Bremen and Verden. In war with Sweden, 1657–60, Denmark lost many islands and her territory on the Swedish part of the peninsula. In 1660 the people granted him absolute powers and made the monarchy hereditary instead of elective. He died in Copenhagen, Feb. 6, 1670.

**Frederick IV** (1671–1730). King of Denmark. Son of Christian V, he succeeded his father in 1699. His reign was marked by successive wars against Sweden, but he was forced to sign peace when Charles XII besieged Copenhagen, 1700. In 1709 he again went to war, capturing Stralsund and Tönningen. By the Peace of Copenhagen, 1720, he had to surrender his gains for a money payment, and his last years were spent in the work of carrying out many much needed internal reforms.

**Frederick VI** (1768–1839). King of Denmark and Norway. Son of the insane Christian VII, he acted as regent from 1784, and became king in 1808. His part in the maritime confederation of Denmark, Russia, and Sweden led to the destruction of his fleet by Nelson at the battle of the Baltic, 1801. His unsatisfactory attitude towards Napoleon caused the bombardment of Copenhagen and capture of the Danish fleet in 1807. His alliance with Napoleon brought about the loss of Norway in 1814. Denmark became bankrupt and did not recover for some years. Himself not free from the taint

of insanity, Frederick had capable ministers, and his reign was marked by political and legal reforms.

**Frederick VII** (1808–63). King of Denmark. Son of Christian VIII, he succeeded his father in 1848.



Frederick VII,  
King of Denmark

He promulgated the constitution designed by his father, and restored parliamentary government, but his tyrannical treatment of Slesvig-Holstein led to the revolt of that duchy in 1848. Frederick was the last king of the Oldenburg dynasty. He died Nov. 15, 1863.

**Frederick VIII** (1843–1912). King of Denmark. Son of Christian IX, he was educated at a Danish

grammar school, and at Oxford. He took part in the war against Prussia and Austria over Slesvig-Holstein, 1864. In 1869 he married Louisa, daughter of Charles XV of Sweden. He succeeded his father in 1906 and died suddenly at Hamburg, May 14, 1912. In 1905 his second son became king of Norway as Haakon VII.



Frederick VIII,  
King of Denmark

**Frederick I** (1657–1713). King of Prussia. The son of Frederick William, elector of Brandenburg and through his mother related to the Orange family, he was born at Königsberg, July 11, 1657. His father married again, and there was some jealousy between Frederick and his stepmother and her offspring; the affair led to the voluntary exile of the young prince, while his father bequeathed parts of his lands to his younger sons. In 1688 Frederick became elector, and by a judicious use of money he persuaded his brothers to give up their shares, thus securing the whole of the electorate.



Frederick I,  
King of Prussia

The central incident of the reign was the elector's elevation to the rank of king. Taking advantage of the emperor's military needs, he won from him this grant, and on Jan. 18, 1701, he crowned himself king of Prussia at Königsberg. His troops fought for several years against France, and this and other reasons threw the finances of the country into disorder. He died Feb. 25, 1713, leaving an only son, Frederick William I, who was the father of Frederick the Great. The second of his three wives was Sophia Charlotte, sister of George I.

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## FREDERICK THE GREAT OF PRUSSIA

Major G. W. Redway, Author of *The War of Secession*

*With this article may be read those on Prussia; France; Germany; those on Frederick's battles, e.g. Leuthen, Prague, Rossbach, and those on his contemporaries, e.g. Catherine of Russia, the Emperor Joseph II, and Voltaire. See also Europe; Seven Years' War*

Born at Berlin, Jan. 24, 1712, Frederick II of Prussia, known as Frederick the Great, was the son of Frederick William I. As a boy he did not share his father's military proclivities, and broke away from the parades of a cadet company of young noblemen which had been established for him to drill, in order to study music and philosophy.

He was to have married in his teens the Princess Amelia of England, but the influence of Austria prevailed with his father, who mated him in 1733 with the princess of Brunswick-Bevern. Meanwhile, Frederick, harassed at home by his royal father, who at table would spit in the dish to prevent his children eating their fill, and once attempted to strangle Frederick for refusing to resign his rights to the succession, ran away from court. He hoped to escape

to Paris, but was caught, tried by court-martial, and sentenced to death. His companion Katte was actually beheaded, Frederick fainting at the sight.

The year after his marriage Frederick joined Prince Eugene in his last campaign on the Rhine. Then he entered into correspondence with Voltaire, and wrote the *Anti-Machiavel*, in which he set forth the duties of a sovereign as "the first servant of his people." He had become reconciled to his father, after whose death—May 31, 1740—he ascended the throne. In the same year the emperor Charles VI was succeeded by his daughter Maria Theresa, who declined to recognize Frederick's claim to Silesia, arising out of political bargains made by his great-grandfather, Frederick William, called the "Great Elector."

The new king of Prussia at once went to war. Marching up the Oder, he took Breslau in December, placed his army in winter quarters, and in the spring of 1741 met the Austrians near Brieg. At the battle of Mollwitz (April 10, 1741) the Austrian cavalry drove the Prussian horse off the field, and the king took flight with them; but Marshal Schwerin had 60 guns and solid infantry with a superior musket, and at sundown the Austrian general, Neipperg, ordered a retreat southwards to Niesse. Frederick was thus left in possession of Silesia. Meanwhile, France, Bavaria, and Saxony had sided with Frederick, and their armies joined him in Moravia. The Austrian army, however, had not been disposed of, and on May 17, 1742, Prince Charles of Lorraine brought the Prussians to action at Chotusitz, S.W. of Königgrätz. Frederick won the battle by a resolute advance with his right wing after his left had been defeated, and so initiated those enveloping movements that have characterised Prussian tactics.

Frederick now hoped to settle down to enjoy his possessions, his flute-playing and literary correspondence, and to improve his army. He rose at 4 a.m. and put on uniform and the high boots which he only discarded once a year—at his wife's court on her birthday. By 9 a.m. he had finished work with his secretaries, and then gave audience to aides-de-camp and private individuals. He dined at twelve, keeping cooks of different nations to prepare special dishes, and drinking champagne. Then he walked rapidly till 4, when he dealt with state and education matters, and at 6 held a concert. By 11 the king was abed.

Meanwhile, Austria, having drawn to her side England and Hanover, was making headway against France, but the Austrian successes were inimical to Prussia, and Frederick, in support of his ally, moved an army into Bohemia. Marching up the Elbe through Saxony, he captured Prague (Sept. 8, 1742), but was outmanoeuvred by Prince Charles and Marshal Traun, and compelled to retreat into Silesia. But on June 4, 1745, at Hohenfriedberg, he attacked the Austrians under Prince Charles, and threw them back into the Riesengebirge. On Sept. 30 Frederick met Prince Charles again at Soor on the Elbe, and again drove the Austrians westward. In Dec. he concerted the measures by which Prince Leopold beat the Austro-Saxons at Kesselsdorf, and then Frederick entered the Saxon

capital, where a treaty was signed on Christmas Day, 1745, by which Austria resigned all claim on Silesia. But in the autumn of 1756 Frederick was compelled to draw the sword against a coalition of all the continental powers, and begin the contest known as the Seven Years' War.

The state of Prussia at the close of the struggle in 1763 has been painted by Macaulay in his well-



*Frederick*  
After C. Vanloo

known essay on Frederick the Great. The king set about the work of reconstruction with his accustomed vigour. He was now fifty, but was to reign for another 23 years as a benevolent despot. No department of church or state was immune from his interference. He would clap a judge into jail, or appoint a cardinal for his Roman Catholic subjects, or keep a general in arrest for weeks. He set up loan offices, built an opera-house, and put his artillery horses to the plough, in the intervals of instructing ambassadors and publishing poetry. History has condemned him for his share in the partition of Poland in 1772, but in fact all but one-seventeenth part of that desolated country went to his two neighbours, and for years Poland had been virtually a province of Russia.

In 1779 Frederick took the field for the last time, for Austria was now ruled by Joseph I, who was bent on reviving the old claim to Silesia. Frederick and his brother Henry attempted an invasion of Bohemia, but the Austrians under Loudon and Lacy had entrenched 50 m. of country so that the two Prussian armies could not unite. The campaign came thus to an inglorious end through the mediation of Catherine of Russia.

Frederick attended manoeuvres in 1785, and caught a chill from which he never recovered. He died childless at his palace of Sanssouci, Aug. 12, 1786, and was succeeded by his nephew, Frederick William II.

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**Frederick.** Name of five electors palatine of the Rhine. They belonged to the family of Wittelsbach (*q.v.*). Frederick I ruled from 1451 to 1476; Frederick II, called the Wise, ruled from 1544 to 1556, having before his accession been prominent in German affairs; Frederick III, elector from 1559 to 1576, made Calvinism the dominant faith in his electorate; Frederick IV ruled from 1583 to 1610.

**Frederick V** (1596-1632). Elector palatine of the Rhine and nominal king of Bohemia. A son of the elector Frederick IV, and grandson of William the Silent, Frederick became elector in 1610 and married, 1613, Elizabeth, daughter of James I of Great Britain.



Frederick V, Elector palatine of the Rhine

By descent and training Frederick was a leader among the Protestants, and as their nominee was chosen king of Bohemia, Nov. 4, 1619. His rival, the emperor Ferdinand II, was, however, too strong, and the first stage of the Thirty Years' War was marked by Frederick's defeat near Prague, Nov. 8, 1619.

He was driven from Bohemia, the Palatinate was taken from him, and he was deprived of his position as an elector. From 1623 until his death, Nov. 29, 1632, Frederick remained an exile. He was the father of Sophia, electress of Hanover, and of the cavalier, Prince Rupert. On account of his short stay in Bohemia he is often called the Winter King.

**Frederick I** (1369-1428). Elector of Saxony. About 1388, when he succeeded to some part of the family lands in central Germany, Frederick began to take a leading part in the affairs of the country,



and assisted the Emperor Sigismund against the Hussites. For these services he received, in 1423, the duchy of Saxe-Wittenberg, the modern Saxony, and the attached dignity of an elector, a connexion of great importance both for Saxony and for Frederick's descendants. He died Jan. 4, 1428, his successor being his son, Frederick II, a comparatively unimportant person, who reigned from 1428 until his death, Sept. 7, 1464.

**Frederick III (1463-1525)** Elector of Saxony, known as the Wise. Beginning his reign in 1486, Frederick soon became prominent in German politics, and might have succeeded Maximilian I as emperor in 1519 had he so desired. He was anxious to improve the methods of governing Germany, but is best known for his friendship with Luther, whom he appointed to a chair in his own university at Wittenberg. After Luther's memorable defiance of the Church, the elector protected him from his enemies. Frederick died May 5, 1525.

**Frederick (1707-51).** Prince of Wales. The eldest son of George II, he was born Jan. 6, 1707, his



Frederick,  
Prince of Wales

father being then crown prince of Hanover. From 1714, when his grandfather became king as George I, until in 1729 he was made prince of Wales, he was called duke of Gloucester. Frederick is important only as the centre of the opposition to George II, and as the father of George III. He and his father were constantly at variance on financial and other matters, and in 1737 the prince was banished from court. He replied by setting up a court of his own at Norfolk House, St. James's Square, and this became the resort of all who were opposed to George II and Sir Robert Walpole. He died March 20, 1751. In addition to George III he left four sons and two daughters by his wife, Augusta, daughter of Frederick, duke of Saxe-Gotha, who lived until 1772. The sons were Edward, duke of York (1739-67), William, duke of Gloucester (1743-1805), Henry, duke of Cumberland (1745-90), and Frederick (1750-65). See *Memoirs of the Reign of George II*, Horace Walpole, 1847; *A Forgotten Prince of Wales*, H. Curteis, 1912.

**Frederick Augustus I (1750-1827).** First king of Saxony. Son of the elector Frederick Christian, he was born at Dresden, Dec. 23,

1750. In 1763 he became elector, and in 1769 began personally to rule. His early years were marked



Frederick Augustus I,  
King of Saxony

by a wise and just conduct of affairs, leading to a prosperity which was interrupted by the French Revolution. He had gained something by a short war against Austria in 1778, but he kept neutral on other occasions until in 1793, as a German prince, he joined in the war on France. He was out of it from 1796 to 1806, when, after Prussia's defeat at Jena, he made peace with Napoleon, and in 1806 he took the title of king.

As an ally of Napoleon, his Saxons were in arms from then until the end, for which action a high price was paid. The king was present at the battle of Dresden, and after Leipzig his capital and kingdom were in the power of the allies and he himself their prisoner. The congress of Vienna took from him a large part of Saxony, about 7,800 sq. m., but he kept the title of king. Until his death, May 5, 1827, he did his best to help his people to recover from the ravages of war.

**Frederick Charles (1828-85).** German soldier, known as the Red Prince. A son of Prince Charles of Prussia and a grandson of Frederick William III, he was therefore a nephew of the emperor William I. Born March 20, 1828, he was trained from a child for the army, both at Bonn and with his regiment. He served Prussia against the Danes in 1848, and was with the Prussian force that invaded Baden in 1849, being there wounded. In 1864 he led a corps into Denmark and was in supreme command during the later stage of the struggle against the Danes.

A scientific soldier and keen on his profession, the prince was closely associated with Moltke and his work. He rose from one command to another, and from 1860 to 1870 he was at the head of the iron corps of Brandenburg, which attained under him its later reputation. In 1866 he was chosen to command an army in the war against Austria, and was largely responsible for the Prussian victory at Sadowa. In 1870 he was



Frederick Charles,  
German soldier

put in charge of one of the three armies that marched into France. He had a considerable share in bringing about the surrender of Bazaine and the fall of Metz, after which he conducted the operations against the French on the Loire, his great success here being at Le Mans. Made field-marshal in 1870, his last post was that of inspector of cavalry. He died June 15, 1885.

The prince was a soldier of great energy, sparing neither himself nor his men in his efforts to improve the condition of the Prussian army. He appears to have been somewhat difficult to work with and his relations with his royal kinsfolk were not always harmonious. He married a princess of Anhalt, and one of his daughters became the duchess of Connaught. He owed his nickname to the colour of the uniform he habitually wore.

**Frederick William (1620-1688).** Elector of Brandenburg, known as the Great Elector. Born in Berlin, Feb.

16, 1620, the son of the elector George William, he passed much of his youth in the Netherlands, a stay that was responsible for his marriage with Louise, a princess of Orange, 1646. In 1640 he became elector, and his first duty was to free Brandenburg from the horrors of the Thirty Years' War. He did this, and from the peace of 1648 to his death he saw his land growing in prosperity.

He organized the army, founded the navy, welcomed industrious immigrants, started colonies in Africa, and encouraged trade. He had great influence in European affairs, and helped William of Orange's invasion of England in 1688. He added to his land both east and west. The peace of 1648 gave him part of Pomerania, Prussia was firmly joined to Brandenburg and Cleves, and Jülich was secured. He died at Potsdam, May 9, 1688, and was succeeded by his son Frederick, 1st king of Prussia.

Frederick William was the real founder of Prussia, for which his reign, autocratic though it was, was wholly beneficial. He was a Protestant and a supporter of the Empire, but neither sympathy was allowed to stand in the way of his main ambitions. See *The Origins of the Kingdom of Prussia*, A. W. Ward, 1908 (in *Camb. Modern Hist.*, vol. v).



Frederick William,  
Elector of Brandenburg

**Frederick William I** (1688-1740). King of Prussia. Born Aug. 15, 1688, he was a son of Frederick I, and related



**Frederick William I,  
King of Prussia**

through his mother to George I of Great Britain. In Feb., 1713, after a somewhat strict upbringing, he became king of Prussia. In the name of economy, he was continually cutting down expenses, although he spent much on the celebrated collection of giants for his army, which he raised to a high state of efficiency.

Frederick was a successful ruler, and greatly improved the condition of Prussia. He provided a more efficient administration; and with an increased revenue old debts were paid off. Trade was encouraged by restricting manufactured imports, and by other methods in harmony with current theories, while E. Prussia was peopled with industrious settlers. He secured Pomerania from Sweden, and was concerned in the various European alliances of the period. He founded a number of schools and, in a somewhat orthodox way, was a friend of learning. He died May 31, 1740. His wife was a princess of Hanover, and his son was Frederick the Great, and, although the king was by no means a wise parent, the wealth and the army that he left laid the foundations of his son's successes. See *History of Prussia*, H. Tuttle, 1884.

**Frederick William II** (1744-97). King of Prussia. Born in Berlin, Sept. 25, 1744, he was a grandson of Frederick William I, and a nephew of Frederick the Great. In 1757 his father, Prince Augustus William, died, and for the next 29 years he was the heir to the Prussian throne. Well educated, he passed this period occupied with his pleasures, chiefly music, troubling little about affairs of state. In Aug., 1786, he became king. In external affairs, Prussia was engaged in watching the progress of the revolution in France, and from 1792-95 in fighting against that country, not, however, with any great determination. A share of Poland was acquired, and there was a campaign against Holland. But in these matters the king was not the leading spirit, nor even the head of the army.

Before his accession he had become a Rosicrucian, and it was a member of this curious fraternity, Johann Christof Wöllner, who

really ruled Prussia, his chief assistant being another Rosicrucian, Johann Rudolf Bischoffswerder. These men spared no efforts to crush liberty of thought, ostensibly in the interest of the Christian faith, and in so doing they counteracted the popularity gained when the king ordered the abandonment of some of the French ideas introduced by Frederick the Great. Frederick William, who died Nov. 16, 1797, was twice married, and had several mistresses. See *A Mystic on the Prussian Throne*, G. Stanhope, 1912.

**Frederick William III** (1770-1840). King of Prussia. Born Aug. 3, 1770, he was the eldest son of Frederick William II by his second wife, a princess of Hesse-Darm-



**Frederick William III,  
King of Prussia**

stadt. He was well educated and had served in the field when he became king in 1797. He suffered the humiliation of Jena and of the surrender of much of Prussia to Napoleon. But in 1812 he called upon his people to rise, and saw the victories and enthusiasms of the war of liberation. He took part in the European conferences of 1815 and after, but, as a rule, merely as an echo of the tsar Alexander I.

At home he showed a dislike for the current liberal movements, but died before Prussia had been seriously disturbed by them. He did something, however, to improve the administration of his lands, especially those acquired in 1815. He died June 7, 1840. His wife was Louise, a princess of Mecklenburg-Strelitz, and it was she who, more than the king himself, helped the ministers to free the country from the misfortunes of 1807. She died in June, 1810.

**Frederick William IV** (1795-1861). King of Prussia. The eldest son of Frederick William III, he was born Oct. 15, 1795. He saw a little military service in 1814, but his main interest was in arts and culture generally. He had been well and carefully educated, and showed a real liking for the society of scholars.

In 1840 Frederick came to the throne. Although he had some

sympathy with the liberal movements of the age, he was a strong believer in maintaining the old order, including the divine right of his own position. He showed sense in acting with much more toleration than his father.

In 1848, during the rising in Berlin, Frederick William appeared, with some loss of dignity, as an enthusiast in the popular cause, but this was a passing phase. He refused, probably wisely, the new crown offered to him by the German princes, and the union was delayed until 1871. Next followed a return to the policy of hostility to Austria, but when this meant war he drew back, preferring rather to give way in the convention of Olmütz. Later he carried forward a little the plan of constitutional reform in Prussia and was concerned in the international matters of his time. In 1857 the king's mind became deranged, and until his death, Jan. 2, 1861, his brother acted as regent.

**Frederick William** (b. 1882). German prince. The eldest son of the ex-Kaiser William II, he was



**Frederick William,  
ex-Crown Prince  
of Germany**

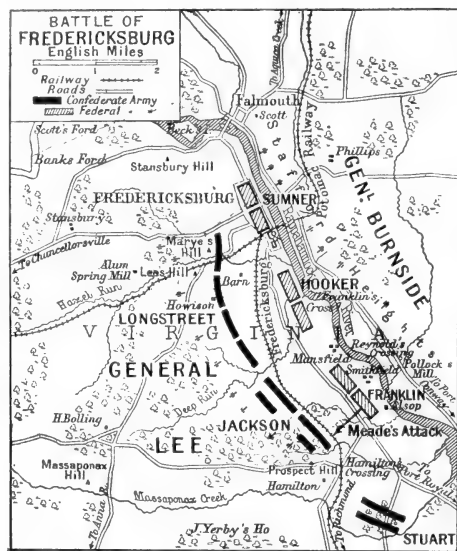
born May 6, 1882, and in 1888, on his father's accession, became crown prince. He was educated for the throne, served in the army, and was loaded with honours.

When the Great War broke out he was given a high command and was nominally the head of a group of armies on the west front. He did not in any way distinguish himself, although from time to time his name was mentioned in official accounts of victories. On the collapse of Germany in 1918 the crown prince associated himself with his father's abdication and took refuge in Holland. In 1903 he was married to Cecile, duchess of Mecklenburg. He published his *Memoirs* in 1922, and in Nov., 1923, returned to his estate in Silesia.

**Fredericksburg**. City of Virginia, U.S.A., in Spottsylvania co. On the Rappahannock river, 60 m. N. of Richmond, it is served by the Potomac, Fredericksburg, and Piedmont, and other rlys. It contains Fredericksburg College, a state Normal school, two public libraries, and a monument to the mother of Washington. Waterpower is obtained for industrial purposes from a dam 300 yards long just above the city. Flour, woollen and silk goods, carriages, leather,



**Frederick William IV,  
King of Prussia**  
*After J. C. Otto*



Fredericksburg. Map showing the disposition of forces in the American battle of Dec. 11-15, 1862

shoes, and cigars are among the manufactures. The town, incorporated in 1782, was the scene of an important battle during the American Civil War. Pop. 5,874.

**Fredericksburg, BATTLE OF.** Fought in the American Civil War, Dec. 11-15, 1862, between the Federals under Burnside and the Confederates under Lee. It took place on the S. bank of the Rappahannock, near Fredericksburg. The object of the Federals, who were on the N. bank of the river, was to cross and gain the road to Richmond, the Confederate capital, but the Confederates barred the way. The Federals numbered 125,596 against the Confederates 85,175, an insufficient majority for attack; moreover, the Confederates had a better supply of officers.

General Lee's army was organized in two corps under Longstreet (1st) and Jackson (2nd) respectively, and a cavalry division under Stuart. Burnside had formed his army in three grand divisions under Sumner (right), Hooker (centre), and Franklin (left). A bend of the river enabled the Federals to bring under the fire of their heavy guns on Stafford Heights a considerable part of the opposite bank, including the town of Fredericksburg, which caused the Confederates to withdraw to a range of low hills about 2 m. from the river, where Lee, on a front of 7 m. or 8 m., constructed defence works and emplaced his guns to sweep all the approaches. On the extreme right was Stuart's cavalry, in the centre Jackson's corps, and on the left Longstreet's.

him. For nearly a month the two armies had been face to face, and most careful preparations had been made on both sides, but since Lee could not be certain where the Rappahannock would be crossed, he kept Jackson's corps some 20 m. down the river until Dec. 12, when the enemy, having completed his pontoon bridges, crossed and seized the town, driving out the small Confederate garrison. On Dec. 13 the Federals were on the right bank. In the result Franklin's two corps assailed Jackson's corps and Stuart's cavalry, Sumner's two corps afterwards attacking Longstreet's corps, while Hooker's command assisted Franklin and Sumner in turn.

The left attack under Franklin employed two divisions, or seven brigades, against six Confederate brigades drawn from the divisions of A. P. Hill, Ewell, and Hood (Jackson's corps). The right attack W. of the town was delivered mainly by Couch's 2nd corps, and was crushed by four Confederate brigades from the divisions of Ransom and McLaws (Longstreet's corps). The attackers on this front, although reinforced by four brigades from Butterfield's 5th corps, failed to reach the Confederate defences. On the left Lee's defences were never in actual danger, for the attackers who escaped the fire of Longstreet's artillery were shot down at musket range.

On the right the encounter was less one-sided, for the Federals contrived to break through Jackson's line at "a point of woods" form-

ing a salient where the ground in rear had been deemed impenetrable through a deep ravine and thick undergrowth. This obstacle, however, was overcome by Meade's division, which got in rear of Lane's and Archer's brigades, and captured part of the supporting brigades under Gregg and Thomas.

In military history this battle is remarkable as exhibiting the power of passive defence when time has been allowed for entrenching. It shows the natural results of a succession of vague orders and the lack of resolution, and the danger of frontal attacks was once again exemplified. It has been said that the defending general missed his opportunity for a decisive counter-attack, but according to Jackson, the Federal artillery completely dominated the plain over which the Confederates would have to advance towards the river. The Federals, therefore, were suffered to remain on the south bank for two days, under the fire of skirmishers.

After the battle Lee's defences were strengthened and his troops redistributed to meet any further attack. But Burnside withdrew his forces (113,000 men) just when the arrangements had been made by the naval authorities to support him by a feint attack with gunboats at Port Royal; he recrossed the river on the night of Dec. 15. Thus Lee's army was left in peace for the winter, for the attempt known as the Mud March, a month later, to move round his left flank and cross the river above the town, collapsed. Violent quarrels ensued between Burnside and his subordinates, some of whom he dismissed; but in the end Burnside himself was relieved of his command. See American Civil War; Lee.

**Frederickton.** City and capital of New Brunswick, Canada. It stands on the river St. John, 84 m. from its mouth, and 68 m. N.N.W. of the city of St. John. It is a station on the C.P.R. and Intercolonial Rly., while steamers ply the river to St. John. The chief buildings are those of the provincial legislature and the government offices, Government House, the city hall, the barracks, an Anglican cathedral, and several churches; also the university of New Brunswick, colleges, and schools.

Frederickton is the centre of a lumbering district and its chief industries are boat-building, canning, tanning, and the making of boots and shoes. The city was founded about 1740, and, although not the largest town, was made the capital in 1788 because it was less exposed to attack than St. John. Its first name was St. Ann's. Pop. 7,208.

**Frederiksborg.** Residential suburb in the S.W. of Copenhagen. The royal palace, erected by Frederick IV, on a commanding eminence, is now utilised as a military college. There are a fine park, zoological gardens, museum, and picture gallery. It is the seat of the royal porcelain factory, and there are also extensive breweries. Pop. 97,237. See Copenhagen.

**Frederiksborg.** Royal palace of Denmark. It is built on a group of small islands in a lake near Hillerød, in the district of Frederiksborg, in Zealand, 21 m. by rly. N.N.W. of Copenhagen. Erected in the 17th century by Christian IV on the site of an older castle, it was restored and embellished after a fire in 1859, and now houses a national historical museum. Several Danish monarchs have been crowned in the chapel.

**Frederikshald** (formerly Halden). Seaport of Norway, in the fylke or co. of Ostfold. It stands at the mouth of the Tistedal river, at its junction with the Ide Fiord, 58 m. direct and 85 m. by rly. S.S.E. of Christiania. Twice burnt down, it has been rebuilt in modern style. A great timber depot, it also exports wood pulp, marble, granite, and fish. It has sugar refineries and tobacco and boot factories. The harbour is safe and commodious.

The town, which was besieged by the Swedes for two years (1658-60), is defended by two fortresses, the famous Frederiksten, founded by Frederick III in 1661, and the Gylendölve, near which Charles XII of Sweden was killed by a musket ball while besieging the town in 1718. It was surrendered to Bernadotte in 1814. Pop. 12,000.

**Frederikshavn.** Seaport of Denmark, on the N.E. coast of Jutland. It stands on the Cattegat, 23 m. by rly. E. of Hjørring, and its fine ice-free port, the second best port in Jutland, is a harbour of refuge. Its exports include butter, bacon, eggs, cattle, pigs, meat, and fish. It is connected by regular sailings with Sweden and England. A mere fishing hamlet in 1818, its population in 1920 was 7,916. The former name was Fladstrand.

**Frederiksstad.** Seaport of Norway. It stands at the mouth of the Glommen river, 58 m. by rly. S.E. of Christiania. A centre of the timber trade, it exports pit-props, planks, bricks, tiles, nails, and granite. There are shipbuilding yards and rly. and chemical works. The old town was built by Frederick II in 1570 and strongly fortified. Pop. 15,626.

**Freebench.** Term used in English law. It is the dower to which a widow is entitled, by the custom of

the manor, out of her deceased husband's copyholds. The amount varies according to the custom of the manor. Sometimes the widow takes the whole of the copyholds for her life, occasionally half. The general rule is one-third; but it may be less. In most manors the



Frederiksborg, Denmark. Courtyard of the royal palace, rebuilt after the fire of 1859

widow forfeits her freebench upon re-marriage, and, in some, by unchastity.

**Freeboard.** The part of a vessel's side above her water-line or line of flotation.

**Free Church.** Term adopted for the various denominations formerly known as dissenters. They claim to possess entire freedom in choice of doctrine, church government, and the appointment of ministers; but most of them are more or less controlled by the terms of the title deeds to their property.

**Free Church Council.** Central organization in England and Wales the object of which is to federate the various Free Churches. Officially styled the National Council of Evangelical Free Churches, it promotes united efforts in the evangelisation of the people, and strives to prevent overlapping. It originated shortly before 1892 in a Free Church Congress held in Manchester, and numerous congresses and annual gatherings have been held since. The Free Church Council has been conspicuous in connexion with many religious and social movements. It has organized district councils or federations all over England and Wales and has employed evangelists to conduct missions throughout the country, the most notable being Gipsy Smith (*q.v.*). Delegates to its annual conference are chosen locally by the Free Churches. A body known as the federal council of free churches was proposed in 1919. The headquarters are at the Memorial Hall, London, E.C. See Nonconformity.

**Free Church of England.** Title assumed at various times by congregations which have separated from the Church of England on doctrinal or other grounds. It is more especially applied to a small sect which originated about 1844 in Devonshire as a protest against the Oxford Movement. It has bishops, who derive their succession from Bishop Greig, who seceded from the American Church. Its doctrines are ultra-Low Church, and it uses a slightly modified version of the Book of Common Prayer. It is now almost extinct in Great Britain.

**Free Church of Scotland.** Name adopted originally by those

members of the Established Church of Scotland who severed themselves from that body in 1843. It is now that of a church dating from 1900, and claiming to be the original Free Church.

In the third decade of the 19th century a controversy arose in the Established Church of Scotland. The outstanding points at issue were patronage and liberty of individual congregations to reject ministers presented to livings. A Veto Act was passed in 1834 by the General Assembly, satisfying the objectors on these two questions. The famous Auchterarder case, decided in the Court of Session, 1838, and confirmed by the House of Lords, 1839, deprived congregations of their right to reject a presentee. The controversy then became acute. Petitions and appeals were made without any result.

The dissatisfied group, known as the non-intrusion party, meeting at the annual assembly in Edinburgh, May, 1843, decided to withdraw from the gathering and marched to Tanfield Hall at Canonmills. There they formed the first Free Church Assembly, electing Rev. Thomas Chalmers as moderator. This constituted what is termed the disruption. In the same month 396 ministers and professors signed an act of separation, renouncing all claims to the benefices held under the Established Church. The signatures ultimately numbered 474. This act of demission represented a voluntary surrender of an aggregate annual income of something like £100,000.

The new Free Church started a sustentation fund, erected new churches, and before long became a

strong body, numerically, financially, and in foreign mission work. In 1900 it was amalgamated with the United Presbyterian Church in Scotland, and was thenceforward known as the United Free Church of Scotland. The present Free Church of Scotland consists of those members of the original Free Church who refused to unite with the U.P. Church in 1900. They are popularly known as the "Wee Frees."

After the union of 1900 the Free Church made legal claim to the entire property of the original Free Church. This claimed to the famous ecclesiastical law case of *Bannatyne v. Overtoun*. It was argued in the court of session, when judgement was given in favour of the United Free Church. The small Free Church party then appealed to the House of Lords, and judgement was given in their favour in 1904. An amazing situation was thus created, for a handful of members were given all the property, churches, manses, colleges, and funds of the original Free Church. In 1905 an Act of Parliament was passed to alter this. A royal commission allocated the property between the two bodies, and generally regularised the position. The Free Church of Scotland is strongest in the Highlands, and at one time had about 180 congregations, but is on the decline. See *Presbyterianism*; *Scotland, Church of*; *United Free Church*; *United Presbyterian Church*; *Chalmers, Thomas*; *Rainy, Robert*.

**Free City.** City that is independent of any save the highest authority. The free cities of the Middle Ages were under the rule of none save the emperor himself, being in practice little republics, each with its own form of government. The modern free city, Danzig (*q.v.*), is under that of the League of Nations only.

The first free cities were towns standing on land ruled by the emperor, but their numbers were augmented when the privilege was found to be a valuable one. Some bought it, to others it was given; while on the other hand some were deprived of it—an instance of this being Donauwörth in 1607. The free cities were represented in the imperial diet from about 1490, and, as constituted later, one of its colleges was composed of their representatives. They were divided into two groups, Rhenish and Swabian, and played a considerable part in the affairs of Germany. Some of them had considerable forces, many had a good deal of wealth, so their help was frequently sought by emperors and

other rulers, especially in times of war. The hostility of the free cities was feared by the most powerful; their support kept kings on their thrones. Their number varied; in 1521 a list gave 84 of them, after which there was a decrease.

With the changes caused by the French Revolution many of the cities lost their freedom, and in 1803 six only were recognized. They were Hamburg, Lübeck, Bremen, Augsburg, Frankfurt, and Nuremberg. In 1806 Bavaria secured Augsburg and Nuremberg, but the other four lasted until 1866, when Frankfurt, having fought against Prussia, lost its independence. As free cities the other three entered the German empire in 1871, and remained therein after the changes of 1918. See *Germany*; *History*; *Town*.

**Freedmen's Bureau.** Public department in the U.S.A. charged with the duty of looking after the freed slaves. It was established in 1865 and continued in existence until 1872, although only intended to last one year. The work was chiefly in the southern states, and took the form of providing for the maintenance and education of the freed slaves, regulating the conditions under which they were employed and administering justice to them. It also controlled the confiscated lands. Many of the officials acted very unwisely, and the bureau was used for political purposes. It fell into disrepute, doing, it was argued, more harm than good, and was ended in 1872.

**Freedom of the Press.** Liberty to print and publish without official licence. By the Press is usually meant the newspapers, but the term includes printing generally. Before the introduction of the military censorship in 1914 the British press had enjoyed this liberty since 1694, save for restrictions imposed by the paper duty, 1694–1861; stamp duty, 1711–1855; advertisement tax, 1712–1853; and libel laws which unfairly shackled expression of opinion until the middle of the 19th century, even to the restriction of references to foreign rulers.

Partial reports of parliamentary proceedings began to appear in print in 1729, but were regarded as a breach of privilege for which summary punishment was inflicted. While this parliamentary privilege is still nominally preserved, reporters have been admitted to parliament since 1835.

From the 15th century in Roman Catholic countries the Inquisition or the bishops acted as censors of the press. At the Reformation Henry VIII assumed this control,

and it was exercised by the Star Chamber till 1640. In 1640–43 the press was virtually free. In June, 1643, parliament revived the censorship; Milton's *Areopagitica*, or *Speech for the Liberty of Unlicensed Printing*, was published in 1644. The office of Licensor of the Press was operative in 1655–79 and 1685–94. The later struggles for a free press in Great Britain were carried on largely on political grounds, and the struggle has followed similar lines in all constitutional countries. See *Censorship*; *Defoe*; *Journalism*; *Libel*; *Marprelate*; *Newspaper*; *Press Bureau*; *Wilkes, John*.

**Freedom of the Seas.** Term used in international law. Grotius, in his work *Mare Liberum* (the free sea), in 1609, advanced the theory that the waters of the ocean are free and open to all traffic, in peace, though he admitted that in war the goods of an enemy in a neutral ship could be seized and confiscated. His doctrine of the freedom of the seas was gradually extended to mean the complete immunity of neutral and even hostile shipping in war from all action by a belligerent navy, thus depriving a combatant fleet of the right to blockade and to seize hostile goods and contraband. In this form it became the second of President Wilson's 14 points of peace, laid down in his speech of Jan. 8, 1918, which required:

"Absolute freedom of navigation upon the seas outside territorial waters alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants."

Had this doctrine formed part of international law—it was always rejected by British authorities—then, in the American Civil War of 1861–65, the S. states could never have been defeated by the ruthless blockade imposed by the United States. In the Napoleonic wars Napoleon would have triumphed. In the Great War Germany would have been free to import arms, munitions, and food, and British sea-power, which eventually brought about her defeat, would have been paralysed.

The Allied governments, in a note to the U.S.A. in Oct., 1918, pointed out "that clause 2 (of the 14 points), relating to what is usually described as the freedom of the seas, is open to various interpretations, some of which they could not accept. They must therefore reserve to themselves complete freedom on this subject when they enter the peace conference." There is no reference to



the freedom of the seas in the treaty of Versailles or the covenant of the League of Nations.

Such a doctrine, if generally accepted, would deprive sea powers of a right which they have almost without exception asserted in past wars, and would confer an enormous advantage on land powers. Armies on land can seize hostile property and interfere in any way they like with neutral trade. Fleets at sea would be forbidden to exercise similar authority. Germany, during the war, declared her acceptance of the new doctrine—precisely as she had accepted and guaranteed before the war the neutrality of Belgium; but what the German government meant by it was thus stated by Count Reventlow in March, 1917: "that Germany should possess such maritime territories and such naval bases that, on the outbreak of war, she would be able with her navy reasonably to guarantee herself the command of the seas." By indiscriminately sowing mines, without any warning, outside territorial waters on Aug. 25-26, 1914, in the North Sea, and on the main N. Atlantic trade route in Oct., 1914, at the very outset of the war the German navy showed its complete disregard of the doctrine which the German government professed to uphold. See Sea Power.

H. W. Wilson

**Freehold.** Term used in English law for land which is free from all charges save those to the state. The essence of it is that it cannot be held for a definite term of years, however long; it must be indefinite. It is the best kind of tenure known to English law, being superior to both copyhold and leasehold. It began as land held by a freeman on a free tenure, and is now the most common form of landholding. What is called a customary freehold is a kind of copyhold. See Land Laws.

**Freelance** (Ger. *freier Landsknecht*, free land trooper). Term originally applied in Germany, and afterwards in other countries, to one who sold his military service to whom he pleased. This usually meant to the highest bidder, without regard to more than inclination or pay. In the later Middle Ages, and for some time afterwards, freelances were very numerous in Italy and France, and spread over the rest of Europe. Sometimes called a soldier of fortune, sometimes a mercenary, he wandered from place to place, if a noble, with a following of men-at-arms, or in company with a number of others like himself. Captain Dugald Dalgetty, in Scott's

Legend of Montrose, was a soldier of this type. The English form freelance comes from confusion with *Lanzknecht* (lance trooper). See *Condottieri*; *Franc-tireur*; *Mercenary*.

In a modern sense the term is applied to anyone who in politics, or any form of contest, preserves his independence of party or association. In journalism a freelance is a writer who earns a livelihood by contributing to newspapers and periodicals without being attached to the regular staff of any one of them. The *Free-Lance* was a London weekly paper started by Clement Scott (q.v.) in 1900.

**Freeman.** One who is free, i.e. one who is not a slave. The distinction between the two classes, bond and free, is an old one. It was found among the Greeks and earlier. In Rome there were two classes of freemen, those who were born free and those who were freed. Among the Teutonic tribes of Europe, including the Anglo-Saxons, the freeman was the one who enjoyed political power and other privileges, who fought, held land, and, in general, formed the dominant class.

The freeman of to-day is one who possesses the freedom of a city or borough, e.g. London, this being in former days the right to share in its government and to enjoy certain material privileges. In England this freedom is now regulated under the Acts of 1835 and 1882. By these acts freemen by purchase or gift were abolished, the right being confined to birth, servitude, and marriage. Honorary freedom of a city or borough is a privilege granted to persons of distinction. Freemen of the City of London play an important part in the election of the sheriffs. See *City Companies*; *Slavery*.

**Freeman, EDWARD AUGUSTUS** (1823-92). British historian. Born at Harborne, Aug. 2, 1823, he was educated at



Edward A. Freeman,  
British historian

Elliott & Fry

private schools. As a boy he showed marked ability, and in 1841 entered Trinity College, Oxford, as a scholar. Four years later he was elected a fellow of Trinity. Having married, he settled down in the country to the career of a writer, making his home from 1860 at Somerleaze, near Wells. His first book was *A History of Architecture*, 1849. He also wrote a great deal for the reviews, especially *The Saturday*

*Review*, and travelled much abroad. Freeman's historical works place him in the front rank of British historians, and are based upon an exhaustive study of original authorities. The first was an unfinished *History of Federal Government*, 1863, followed by the *History of the Norman Conquest*, 6 vols., 1867-99, which remains the chief authority for the period, although later scholarship has declared against some of its theories.

In 1884 Freeman was appointed regius professor of modern history at Oxford, a post he had desired in 1858, but his best work was already done. He delivered the statutory lectures, but his health was bad, and he died at Alicante, Spain, March 16, 1892. A man of strong and outspoken views, he attained some eminence as a Liberal politician, but failed to enter Parliament. He denounced the iniquities of the Turks, and showed warm sympathy for the Greeks. His minor works include *Historical Essays*, 1871-92; *The Reign of Rufus* and *Accession of Henry I*, 1882; *History of Sicily*, 1891-4 (completed by A. J. Evans). See *Life and Letters*, W. R. W. Stephens, 1895.

**Freeman, MARY ELEANOR WILKINS** (b. 1862). American novelist. Born at Randolph, Mass., and educated at Mount Holyoke seminary, she contributed short stories to the leading periodicals, and published her book, *The Adventures of Ann*, in 1886. In 1887 she won wide popularity with *A Humble Romance*. She gained valuable literary experience by her long work as secretary to Oliver Wendell Holmes. Her work shows sympathy and quiet humour in presenting country types of the New England villages. Later works included *A New England Nun*, 1891; *Jane Field*, 1892; *Madelon*, 1896; *Silence*, 1898; *Jamesons*, 1899; *The Shoulders of Atlas*, 1908; *The Copy-Cat*, 1914.

**Freeman's Journal**, THE. Dublin daily newspaper. Started as *The Public Register*, or *Freeman's Journal*, a bi-weekly sheet, Sept. 10, 1763, it dropped its first title in July, 1807. In the opening part of the 19th century it became the organ of the Irish Nationalists. From 1879 to 1902 it was the official organ of Dublin Castle. Henry Grattan is said to have written first for *The Freeman's Journal* his character of Lord Chatham. The paper was temporarily suspended in Dec., 1918, by the military authority because of alleged publications calculated to create disaffection; and, on a similar charge, was the subject of two courts-martial in 1920. N.V.

## FREEMASONRY: ITS ORIGIN & HISTORY

Dudley Wright, Assistant Editor of The Freemason

*This article gives some idea of the extent to which freemasonry has spread throughout the United Kingdom and over the civilized world.*

*See also Guild*

The origin of freemasonry cannot be traced with certainty. Many of its ceremonies and practices have a striking affinity with the ceremonies and ritual of the Eleusinian, Samothracian, Dionysian, and other ancient mysteries, as well as with the most ancient religious ceremonies known, particularly the initiatory rites and ceremonial proved to have prevailed among Indian races, the Druids, etc. Even the origin of the word freemason cannot be stated with precision. Legend ascribes it to an incident connected with the erection of Solomon's Temple, but O'Brien, in his Round Towers of Ireland, says that the word must be traced to Goban-Saer, the supposed architect of those towers, that the word *Saer* means Freemason, and that those towers were masonic edifices, exclusively appropriated to the worship of the Great Architect of the universe. The existing masonic constitution is also akin to that prevailing in the ancient trade guilds of England and other countries.

### Early British Lodges

The oldest masonic records in the British Isles are in Scotland. Edinburgh Lodge, No. 1, the oldest Scottish lodge, possesses record books from 1599, but these do not record the beginnings of that ancient organization. The famous Kilwinning Lodge is also claimed to have been in existence at that date as a governing body, but its minute books date only from 1642. There is a traditional list of grand masters in England, dating from A.D. 290, beginning with Albanus, and ending, before the historical period, with the names of Charles Lennox, the first duke of Richmond, and Sir Christopher Wren. But the historical foundation even for these names, it must be admitted, is slender.

The first freemason to be initiated on English soil, so far as the records show, was Sir Robert Moray, who was also one of the founders and first president of the Royal Society. He was initiated at Newcastle-on-Tyne, May 20, 1641, the entry being ratified by the signatures and masonic marks of four brethren, including General Hamilton. Elias Ashmole, also one of the original members of the Royal Society, was initiated at Warrington five years later. Some founders of the Royal Society and its principal officers and members

for several years were leading members of the masonic order.

The organization of the grand lodge of England was effected June 24, 1717, by the union of four lodges then meeting in London three of which are still in existence, and since that date 140 other grand jurisdictions in various parts of the world have been formed, all of which owe their parentage, directly or indirectly, to the grand lodge of England. Of these 49 are in the U.S.A.; 34 in Europe; 21 in Central America; 15 in South America; nine in Canada; eight in Australasia; three in Africa; and one in Oceania. The grand lodge of Ireland was formed in 1729 and the grand lodge of Scotland in 1736.

### Grand Lodge of England

In the grand lodge of England two offices only are elective, viz. grand master and grand treasurer, the remaining offices being in the appointment of the grand master, a similar custom pertaining to the grand lodges of Ireland and Scotland. The practice varies in the U.S.A. and other countries, but most, and in some jurisdictions all, officers are elected by the members of the grand lodges.

In England when a prince of the blood royal is elected grand master, a pro grand master may be appointed. The head of the craft in Scotland is known as the grand master mason. In private or subordinate lodges, the master, treasurer, and tyler are elected by the members, but it is essential that the master should first have served one complete year as warden.

In 1813 the designation united grand lodge of England was adopted as the official title, on the occasion of the union with some rivals of the original body, who, in 1751, had formed an independent grand lodge, known as the "Ancients," and who eventually secured as grand master the duke of Kent, father of Queen Victoria. He, however, reigned over that body for one month only with the object of bringing about the union. The duke of Sussex then became grand master of the united body, holding the office until 1843, since which date there have been but four grand masters, viz. the 2nd earl of Zetland, the marquess of Ripon, the prince of Wales (King Edward VII), and the duke of Connaught. In 1908 Lord Amphilhill became pro grand master, and in

1903 Sir Frederick Halsey, Bart., was appointed deputy grand master.

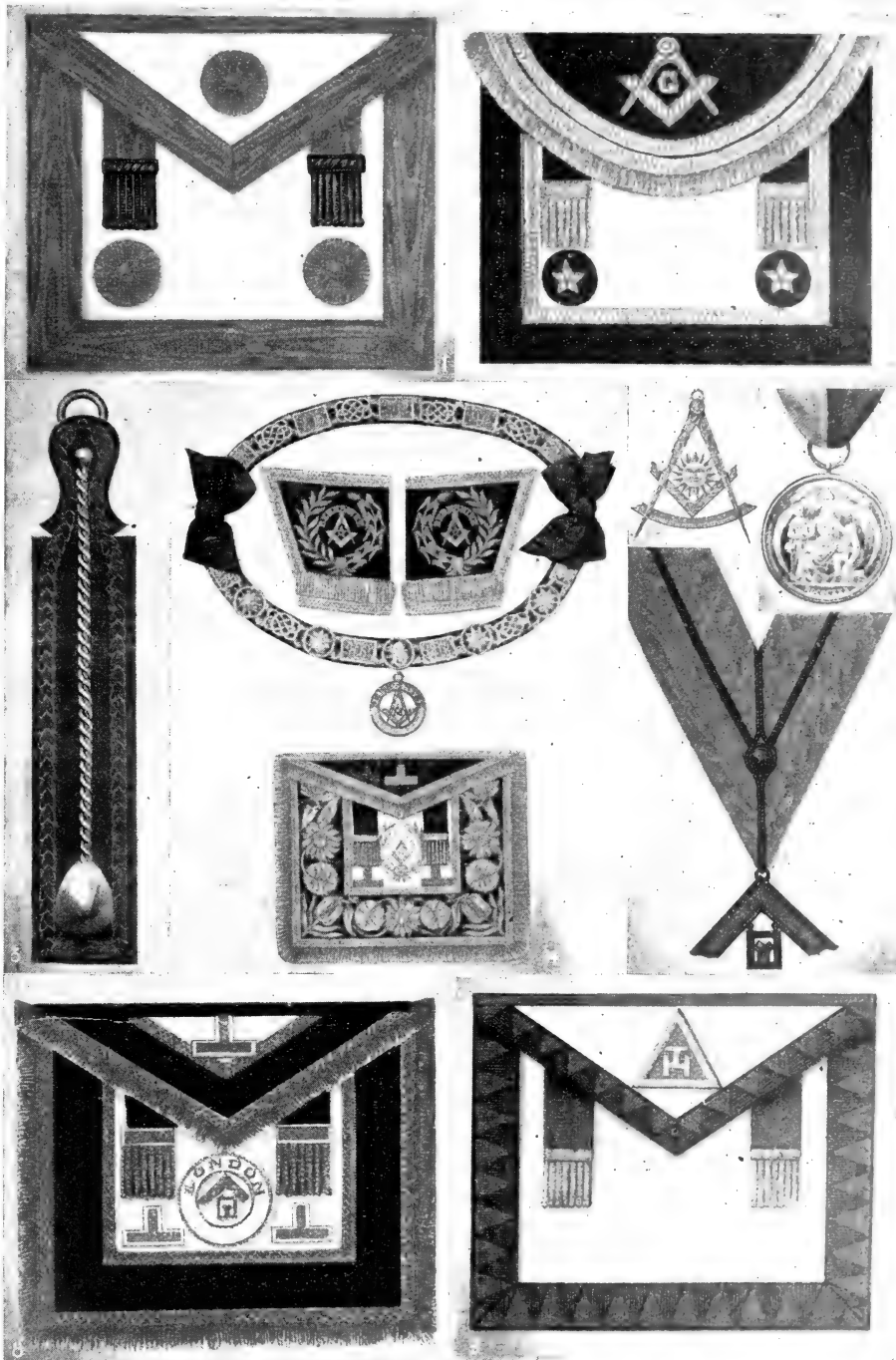
The grand lodge of England has within its jurisdiction 46 provincial grand lodges in England and Wales and 35 district grand lodges overseas. There is not, however, inter-visitation between all the major grand jurisdictions, owing to the fact that a few have ceased to regard it as obligatory on the part of candidates for initiation to declare a belief in the existence of a Supreme Being and the doctrine of immortality, two of the most ancient landmarks of the craft, set forth in the earliest Book of Constitutions, published in England in Jan., 1723. This, by the way, speaks of Inigo Jones, one of the names mentioned in the traditional list, as "our great master mason." The discussion of religious and political subjects also is strictly forbidden in British, American, and Asiatic lodges, although it enters largely into Continental masonry.

The growth of freemasonry in all countries, with one solitary exception—that of Germany, which has nine grand lodges—has been extraordinary, particularly since 1914. To-day the grand lodge of England has at least 3,600 lodges within its control, while the lodges throughout the world number between 27,000 and 28,000, with an aggregate membership of approximately four millions.

### Benevolent Activities

Freemasonry the world over is noted for its benevolent activities. In England there are three well-known institutions, viz. the Royal Masonic Institution for Girls, founded in 1788, which has a senior school at Clapham Junction, with a junior school and convalescent home at Weybridge, opened in Aug., 1918, with nearly 800 girls receiving benefits; the Royal Masonic Institution for Boys at Bushey, Herts, founded in 1798, with nearly 900 boys receiving benefits; and the Royal Masonic Benevolent Institution for Aged Freemasons and the Widows of Freemasons at Croydon, founded in 1836, which has nearly 15,500 annuitants on its register.

The war brought into existence the Freemasons' War Hospital in Fulham Road, the outcome of the original scheme for the establishment of a masonic nursing home and hospital, to which it has reverted, the institution being founded on an endowment fund provided by subscription. The income of the three first-named institutions, collected at the annual festivals, amounts approximately



1 and 2. Master Masons' aprons: 1, English.  
2, Scottish. 3. Plumb rule, warden's badge of office.  
4. Apron, collar, and gauntlets of Provincial and District  
Grand Master. 5. Scottish Past Master's jewel.

6. Charity jewel. 7. English Past Master's jewel on  
collar. 8. Apron of London rank, also of District  
and Provincial Grand Lodges. 9. Apron of English  
Royal Arch degree

# **FREEMASONRY: JEWELS AND CLOTHING OF THE ANCIENT CRAFT**

*By courtesy of George Kenning & Son*

to £250,000 per annum. In addition to these central institutions every English province and nearly every district has one or more funds for local relief. Ireland and Scotland also have their institutions and benevolent funds, whilst all the American jurisdictions have established various hospitals, orèches, and other institutions.

The term freemasonry is applied strictly only to what is known as Craft Masonry. Outside this parent stock there are several branches. Royal Arch Masonry is governed in England by the Supreme Grand Chapter, Mark Masonry (including the Royal Ark Mariner degree) by the Grand Mark Lodge, both of which bodies, as well as the Craft, have the duke of Connaught as Grand Master. The next largest masonic body is that of the Antient and Accepted Scottish Rite, followed by the Knights Templar, of which bodies the duke of Connaught is respectively Grand Patron and Grand Master. Other branches are the Allied Masonic Degrees, the Royal and Select Masters, the Order of Malta, the Knights of the Red Cross of Constantine, the Royal Order of Scotland, the Order of the Secret Monitor, and the Societas Rosicruciana. Initiation into Craft Masonry is indispensable for admission into any of these subsidiary degrees.

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**Free Port.** Port at which no customs or other duties are charged on goods. In the Middle Ages there were a number of these ports, some being in Italy, others in Germany and elsewhere. Their existence made it much easier for merchants to exchange their wares than would have been the case if duties had to be paid before this could be done.

A modern substitute for the free port is the bonded warehouse system, although some free ports still exist, e.g. Hong Kong and Singapore. In other cases a free port and an unfree one are side by side in the same seaport. Thus Hamburg and

Copenhagen have each a free port, as well as the ordinary one for the import of goods. The former is used for the receipt of merchandise that is not for sale in the country itself, but is being transhipped for sale elsewhere. The free ports of modern China are such in a different sense; they are ports open to foreign trade. See Bonded Warehouse.

**Freeport.** City of Illinois, U.S.A., the co. seat of Stephenson co. On the Pecatonica river, 112 m. W.N.W. of Chicago, it is served by the Chicago and North-Western and other rlys. Here in 1858 occurred the celebrated debate between Douglas and Lincoln, in which the former proclaimed the Freeport doctrine. Settled in 1835, it was incorporated in 1850, and became a city in 1855. Pop. 19,845.

**Free Reed.** In musical instruments in which the sound is due to the vibrations of a reed or tongue the reed is termed free when it is just small enough to pass through the frame on which it is fitted. When it is a little larger and beats against the sides of the opening, as in organ trumpet pipes, it is called a Beating Reed or Striking Reed. Most of the tongues used in the harmonium and American organ are free reeds. See Organ.

**Freeasia.** Small genus (two species only) of bulbous herbs of the natural order Iridaceae. They are natives of the Cape of Good Hope. They have long, narrow, grass-like leaves and large funnel-shaped white or yellow flowers. *F. leichtlinii* has yellow or cream-

coloured flowers, and *F. refracta* pure white blossoms, marked with violet lines and sweetly scented.

**Free Soil.** Name given in the U.S.A., before the total abolition of slavery there, to soil on which it was not permitted. Early in the 19th century the Union consisted of an equal number of slave and free states, each entry of a new slave state being balanced by the entry of a new free soil state.

In 1847, the anti-slavery cause having strengthened, it was proposed to make slavery illegal in all the territories, particularly the district recently secured from Mexico, and so confine slavery to the existing slave states. To support this the Free Soil party was formed. It consisted of both Democrats and Whigs, seceders from their own parties, and was strong enough to secure the nomination of its own candidate, Martin van Buren, for the presidency. He failed, however, and they were equally unsuccessful in 1852, but they sent members to Congress and were influential until 1856, when they gave up their separate organization and became merged in the Republican party. The party motto was free soil, free speech, free labour, and free men. See Republican; Slavery; United States: History.

**Freestone.** Sedimentary rock usually sandstone, but sometimes limestone, which can be easily worked with the chisel and lacks the usual tendency to split along certain planes. It is extensively used in architecture for mouldings.

## FREETHOUGHT AND FREETHINKERS

Right Hon. J. M. Robertson, Author of History of Free Thought

*The point of view of the freethinker, as that of believers in the various religions, is the subject of an article in this Encyclopedia. See also Apologetics; Christianity; Dogma; Rationalism; Renaissance*

Though the appellation "freethinker" has not entirely lost the aspersive sense which generally attached to it among Christians from the time of its coming into common use (c. 1700), the term "free thought" may now be regarded as a scientific label for the attitude of mind which challenges all demands for belief on grounds of traditional or documentary authority. Broadly considered, this attitude reacts in the same way against historical and other propositions as against religious dogmas and narratives; but inasmuch as the latter have always made the most menacing claim to uncritical acceptance, it is to the critical refusal of acceptance in their case that the term has always been commonly applied.

On a wide survey it becomes certain that while the normal

attitude of the untrained mind towards all serious or minatory assertion concerning the unknown is one of credulity, there has occurred at all stages of human development some amount of variation towards rational doubt. Alike among savages, among barbarians, and among the more civilized peoples of all times and countries, there has always been a varying minority of minds who spontaneously doubted more or less the truth of current myths, legends, and dogmas. The "sceptical" attitude is thus a natural variation, like another, and it depends for its spread upon the totality of the circumstances which check or make for free discussion. These may be simply economic, or largely cultural or political.

Inasmuch as religious systems are readily able to employ all three

factors, the assailing doubt generally suffers from that disadvantage; but even in a primitive community the economic factor may at times be negatively on the side of freedom, as when a series of famines may lead to the extinction, as impostors, of all the "rain-makers" of an African people. The primary bias to doubt, however, being by far less common than the contrary, freethought in progressive conditions is always a matter of resort to methods of rational appeal (whether well or ill conducted) as against the common bias to belief reinforced by "authority" on social, political, and economic lines.

That both attitudes are in some degree primarily temperamental is indicated by the significant fact that many adherents of a modern orthodoxy are found to show a spontaneous animus against ancient "freethinkers" as such, though the beliefs which those doubters rejected as false are also rejected as false by their modern assailants, and often described by them as pernicious.

Historically speaking, it is broadly certain that freethought spreads in the ratio of the culture contacts of peoples, whether by way of simple intercourse or of literary communication. The mere differences of early religious beliefs, being so marked and so innumerable, constitute a propulsion to doubt when they are simply noted. Where the doubt has most intellectual elbow-room it will be most developed.

#### Ancient Times

Thus, while doubt concerning the gods can be seen among the priestly circles of ancient India, Babylonia, and Egypt, to lead to a compromise on the lines of a pantheism which conserved the old cults upon economic motives, in the freer world of republican Greece, which enjoyed the maximum of culture contact and free discussion, and had the smallest development of priestly organization, the critical process was both more general and more searching. Josephus, in his diatribe Against Apion, expressly reproaches the Greeks with the multiplicity and divergence of their historical reconstructions as contrasted with the unquestioned uniformity of tradition among his own race.

The very fact that that tradition had undergone much priestly manipulation in the historic past had passed out of orthodox Jewish knowledge; the Jewish community having come to represent a selection or survival of conformists and devout believers from among a

race which had parted with multitudes of its doubters.

In that case the retaining power had been the successfully established cult of the Sacred Book. In Greece there was neither Sacred Book nor centralized priesthood. And the subsequent history of freethought turns mainly on the faith-commanding power of Sacred Books, whether in subordination to or in alliance with other factors. Roughly speaking, the history of the Catholic Church down to the Reformation consisted in the subordination of the authoritarian claims of the Sacred Book to those of the hierarchy, the former having been found to involve constant risks of destructive schism.

#### Protestantism and Schism

This was freshly illustrated in the schisms which rapidly overtook Protestantism, when that movement erected the claims of the Sacred Book to belief above all others; and to such schism the Catholic hierarchy were able to point as discrediting Protestantism from the point of view of the general bias of faith.

Since the Reformation, the history of western freethought has been one of more or less continuous gain in intellectual prestige as against the authority of the Sacred Book in Protestant countries and that of the hierarchy in others, the lines of advance being those of science, historical criticism, ethics, and democratic politics. The bias of faith may often be found still subsisting in promoters of all of those movements; but the collective result is a growing proclivity to the critical method, broadly known as that of rationalism.

Perhaps the most generally disintegrating process is that which systematically develops the early factor of culture-contacts by the scientific comparative study of all the primitive forms of religion, from which the later are now generally recognized to derive. Religious beliefs are thus themselves in a state of increasingly rapid change, even among biased believers; and the critical process, grounded on the sciences and rationalistic ethics, becomes increasingly confident, even while growing less polemical.

The historic process has been, as regards the more educated classes or sections, one of action and reaction. In post-medieval and Renaissance Italy, clerical abuses promoted freethought; and in France and England after the Reformation it advanced considerably after periods of religious strife, being active in the later years of Elizabeth, and again after

the Restoration. Yet again, as a result of both scientific and scholarly progress, it spread greatly, under the form of Deism, in the England of the first half of the 18th century.

Commercial and imperial expansion and the Methodist Revival later weakened the intellectual activity, which, however, was taken up in France, then ripening for the Revolution; whereafter political reaction in both countries produced a reign of conformity in the middle and upper classes, leaving the new democratic freethought partly at work among the lower, in so far as they were accessible to propaganda.

An organized freethought propaganda, mainly democratic, is a notable feature of the second half of the 19th century, alike in Britain, the U.S.A., France, Germany, and other European countries. Proceeding as it did on the subversive criticism alike of science and scholarship as against the Sacred Book, it was most active in the period of active religious resistance to such criticism, flagging as a specific activity when the Churches in general began to accept that criticism, thereby weakening their own foundations and turning belief into a passive rather than an active force.

#### Influence of Freethought

The relative subsidence of specific freethought propaganda is thus a mark of its success, the educative process being thenceforth carried on by the specific activities of science and ethics and general truth-seeking research. Churches which a few centuries ago were shedding blood for supernaturalist doctrines of sacraments, and later were battling against Deism for the divinity of Christ, are now concerned to prove His mere historicity.

Throughout civilized Europe, while a measure of social ostracism still falls in some countries upon those who openly reject the whole body of traditional religion, the shifting of the religious ground has greatly weakened the power of the Churches to resort to forcible suppression of criticism, and the economic and cultural obstacles to freethought are really the more powerful. In Great Britain it has been gradually recognized that persecution merely multiplies the assault, giving it new economic resources through popular interest and sympathy. Alike in the time of Thomas Paine and in that of Charles Bradlaugh, persecution greatly strengthened the popular movement. At the same time, growing knowledge of all kinds weakens





Freetown, Sierra Leone. The sea front and harbour of the W. African port

both the temper and the social basis of persecution; and Churches whose clergy are in most cases pronounced heretics from the point of view of their own official creeds are largely incapacitated for suppressive measures. Many eminent literary men of the last generation having committed technical "blasphemy" in a supreme degree, that offence is now never prosecuted in this country save when accompanied by contravention of ordinary police regulations.

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**Freetown.** Port, coaling station and capital of Sierra Leone, British W. Africa. The city is situated on the Sierra Leone river, with wooded mountains to the S. and E., at the N.W. extremity of the

Sierra Leone peninsula. The climate was unhealthy for Europeans, but now that the malarial marshes are drained and the principal European residences built on the highlands, reached by the mountain rly., the conditions have been much improved. Freetown was founded as Granville town in 1788 as a residence for freed African slaves.

The harbour is the best on the W. coast of Africa, and is connected with the interior by a narrow-gauge rly., running in one direction towards the N.E. of the Protectorate, and in the other towards the S.E., near the frontiers of Liberia and French Guinea. Should the proposed western branch of the Trans-Sahara Rly. be built, Freetown, as one of the nearest points to S. America, would, if joined to this Rly., become of great importance as a through route. The town possesses a cathedral and several educational establishments. The chief exports through the port are palm-kernels and oil, kola nuts, rubber, gums, and ginger. There is a wireless station. Pop. 34,090, including 558 Europeans.

## FREE TRADE: THE THEORY & ITS GROWTH

Harold Cox, Editor of The Edinburgh Review

*With this article should be read those on Protection and Tariff Reform, the two sides of the question being thus brought together. See Smith, Adam; Wealth of Nations; also Political Economy, Wages, and articles on other economic questions; Industrial Revolution; Mercantile System*

Free trade is a term meaning, in general, the absence of restrictions of any kind on trade. In modern speech it refers particularly to the system by which goods are allowed to enter one country from another without paying customs duty for the protection of home producers.

The intellectual revolt against protection began with the publication of Adam Smith's *Wealth of Nations* in 1776. Pitt was converted by Smith's arguments, and England was beginning to move in the direction of freer trade with France when the outbreak of war in 1793 put a stop to all legitimate trade between the two countries. It was not until after Waterloo that the agitation against protec-

tion was revived. In 1820 a notable statement of the free trade case was drawn up by the merchants of the cities of London and Edinburgh. The proposals embodied in this document—popularly known as the Merchants' Petition—formed the basis of reforms in the direction of free trade carried out by Huskisson in 1823 and the years immediately following. But the most drastic reforms were effected in the 'forties. In 1842 a large number of protective duties were swept away; in 1846 the Corn Laws were abolished; and in 1849 the Navigation Acts were repealed. The victory of the free traders was, by the end of the 'forties, so complete that political

controversy on tariff questions died down.

Fifty years went by before any renewed attempt was made to disturb free imports. During these years the population of the United Kingdom increased from 28,000,000 in 1851 to 42,000,000 in 1901; its total overseas trade per head of the population increased from £6 10s. in 1850 to £21 6s. 5d. in 1900; the yield of a penny in the income tax increased from £1,200,000 in 1861 to £2,500,000 in 1901; merchant shipping registered in the United Kingdom increased from 3,600,000 tons in 1850 to 9,600,000 tons in 1901. During the same period immense additions were made to the Empire and its unity was demonstrated.

During the twelve years that elapsed between 1902 and the outbreak of the Great War the commercial progress of the kingdom was in many respects relatively even more rapid than in the previous half century, and in 1914 the spontaneous action of the Dominions finally disposed of the suggestion that their loyalty was dependent on tariff favours.

These broad historical facts show that since the free trade theory has been put into practice England has had little reason to be dissatisfied with the results.

### British Free Trade

Concise stated, the free trade theory is that the prosperity of Great Britain and Ireland and the unity of the British Empire are best advanced by leaving the ports of the United Kingdom open to the goods and the shipping of all the world, subject only to such charges as may be imposed for revenue purposes, and to such measures as may be necessary to guard the country against injury at the hands of an actual or a potential enemy. That a similar proposition is true for other countries most other countries have denied.

It was no mere accident that brought England to adopt the policy of free imports while most other nations remained protectionist. There are both mental and material causes for the difference. The principal mental cause is the long English tradition of individual liberty. That tradition makes government interference less tolerable to Englishmen than to other peoples. Americans share this English mentality, but their material circumstances are different.

The U.S.A. is a vast area containing within its confines most of the requisites for civilized human life; it is, therefore, possible for its citizens to live and flourish with an external trade which is very small

in comparison with the internal trade of their continent. Consequently, if that external trade is subject to protective duties, the effect on the general body of the people is relatively unimportant.

#### Britain and Free Trade

In the case of Great Britain the situation is entirely different. The country is not very large; its natural resources, except in the matter of coal and good pasturage, are extremely limited. If the people of Great Britain attempted to "keep themselves to themselves" they would have a very poor life indeed.

England's success in the world had its origin in the sea-going instinct of the English race which a long, indented coast-line further developed. To-day the industrial energies of Great Britain are devoted largely to the production of goods for export. But if a country is to carry on successfully a very large export trade against the competition of other countries, and often against the handicap of hostile tariffs, it must produce cheaply. One of the most important elements in cheap production is the cheapness of the materials and of the instruments employed in the processes of manufacture. Any tariff that is imposed to give protection to producers for home consumption almost inevitably injures producers for export. If, for example, a duty be imposed on imported steel bars in order to give protection to the producers of steel, it will injure the shipbuilding industry, the locomotive industry, and almost every branch of engineering.

These illustrations show that in a country with a highly developed and complicated export trade it does not suffice to exempt from taxation what are sometimes called raw materials, for that term certainly could not be applied to such highly manufactured articles as steel bars or cotton yarn. Almost every important manufactured article is indeed itself the material for some further manufacturing or industrial process. If a tariff were confined to those imported articles, say French motor-cars or Austrian gloves, which were ready for immediate use by the ultimate consumer, it would protect very few industries and would indeed more appropriately be described as a luxury tax than a protective tariff. In fact, in the United Kingdom protection cannot be given by means of a tariff to any of the great staple industries without injuring others which may be of equal or even greater importance.

It is, of course, arguable that an

all-wise government, by picking out the more important industries for encouragement and the less important for discouragement, might add to the economic strength of the nation. But even if it were quite easy to discover an all-wise government, it still would be difficult to see on what principle such a government would proceed. Among the most important industries of the United Kingdom are cotton manufacture, coal mining, and ship-building. They account together for a very large amount of well-paid employment and for the production of a great volume of wealth. They cannot be benefited by any kind of tariff; they would be injured by almost any duties imposed to benefit other industries. Would an all-wise government select these great industries for discouragement and some other industries for encouragement? and if so, what other industries and for what reasons?

#### Agriculture and Protection

There is indeed one industry which on national grounds can put forward a plausible case for protection, namely agriculture. The practical difficulty is that, if the tariff on imported agricultural produce were low, it would make very little difference to our home agriculture; while if the proposed tariff were high, the urban population would resist its imposition, and as against the urban vote the friends of agriculture are politically powerless. It is important, too, to remember that agriculture itself is not one industry, but many. The interests of the dairy-farmer and of the pig-breeder are by no means identical with those of the wheat grower.

These are examples of the considerations which lead the free trader to argue that it is better for the Government not to interfere in matters of trade between man and man, between one industry and another. Doubtless private enterprise may sometimes go astray. The search for individual profit does not necessarily lead to the highest national advantage. But in the main private enterprise can only succeed by developing those industries which are best suited to the character of the people and to the natural resources of the island. Where blunders are made by private enterprise they are quickly corrected, for to persist in an economic blunder means bankruptcy. On the other hand, the State in interfering with the course of trade is not necessarily guided at all by any sound economic motive; it may be compelled to action solely by political corruption. Moreover, even if the intentions of a government are

honest, there is no means by which it can constantly test the wisdom of its policy. It may blunder along, hampering where it intended to help, pulling down instead of building up, continuing the mischief unchecked for decades, until new political forces have grown strong enough to sweep away the whole policy. That is why the free trader asks that, in matters of trade, politicians should leave the individual free to do his own blundering at his own expense, and free also to achieve success for himself and incidentally for the nation by his own unhampered methods.

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**Free Wheel.** Term given to a gear or pulley wheel which is provided with a clutch or detent in such a manner that the wheel may either turn with the axle on which it is placed or rest idle on the axle, while the latter turns. In the former case the wheel is working, in the latter idle. A now familiar example is provided by the common bicycle and another by certain forms of lawn-mowers in which the wheel "works" when the mower is moved forward, but is idle while the machine is moved backwards. Many other varieties are found in mechanics. See Cycling.

**Free Will.** Psychologically, the theory that men's actions are not dependent on any external force, but are the result of conscious motives operating from within. Metaphysically, free will is the power of acting independently of any cause whatever, external or internal—the capacity of willing or not willing the same thing at the same time. The question of its existence cannot be settled metaphysically by self-examination. The consciousness that we might have acted differently, had we so willed it, is beside the point, which is, could we have so willed? "It is certain that I can act as I will, but to say that I can will as I will is senseless" (Hobbes). The existence of free will (metaphysically) is denied by determinism (*q.v.*), affirmed by indeterminism. See Calvinism.

**Free Will Baptists.** Arminian section of the Baptist denomination in America, corresponding to the General Baptists in Great Britain. Originating about 1780 through the preaching of Benjamin Randall, one of Whitefield's converts who joined the Baptists, they

separated from the Baptist body, which at that time was strongly Calvinistic, and taught Arminian doctrines. *See* Baptists; Calvinism.

**Freezing Machine.** Double pail for making ice-cream. Ice and salt, broken very small, are packed into the outer pail in layers of three inches of ice and one of salt nearly to the top. The cream mixture is poured into the central pail, which is provided with a dasher, its handle passing through a hole in the top; this is turned until the mixture is set. *See* Ice Cream.

**Freezing Mixture.** Mixture of two substances, usually ice or snow and some kind of salt, which produces great cold. When common salt is added to snow which is on the point of freezing, its first effect is to lower the freezing point of that part of the snow with which it is brought into immediate contact; some of the snow is accordingly melted and forms a strong solution of salt. In this solution the molecules of water and of salt enjoy much greater freedom of motion than in the solid form, and require extra energy, which is provided in the form of great heat from the surroundings. Thus the temperature of the snow is reduced below its normal freezing-point, and at the same time the saline solution melts more snow, this process continuing until a limiting low temperature is reached at which the whole mixture freezes. A temperature of  $-20^{\circ}\text{C}$ . can be reached in this way with a mixture of snow and common salt, but by the use of other salts which dissolve with greater absorption of heat much lower temperatures can be obtained. For example, calcium chloride in its crystalline form, mixed with snow in the proportion of 10 parts to 7, will produce a temperature of  $-55^{\circ}\text{C}$ .

**Freezing Point.** Temperature at which a liquid assumes the solid form. The freezing point of water, that is, the temperature at which it changes into ice, is one of the fixed points on the thermometric scale ( $0^{\circ}$  Centigrade,  $32^{\circ}$  Fahrenheit). Liquids may be roughly divided into two classes as regards the properties they exhibit in the process of freezing; water is an example of the liquids which undergo crystalline solidification, in which there is a change of volume, and the liquid gives out a definite quantity of heat, called the "latent heat," in its abrupt change to the solid form. On the other hand, molten glass is a liquid which undergoes "amorphous" solidification; as the temperature falls the glass ceases to run freely, and becomes viscous, then gradu-

ally hardens into a solid. The second class of liquids can hardly be said to have a definite freezing point, although the corresponding solids have a melting point, namely, the temperature at which they begin to run.

To return to the first type, in which freezing is an abrupt change, it is a fact of great importance that the freezing point is not absolutely constant, but varies under pressure. Water expands when it freezes, and the effect of pressure is to lower the freezing point. Paraffin wax, on the other hand, contracts in freezing, and here the effect of pressure is to raise the freezing point. In other words, those liquids which can solidify only by expanding, are hindered from freezing by external pressure, while those which have to contract in order to freeze are helped by external pressure.

The freezing point of a liquid is lowered by the presence of a salt dissolved in it. Thus a solution of common salt in water will not freeze until its temperature has been lowered considerably below the freezing point of pure water. The reason for this appears plainly from the molecular theory. According to this theory the molecules of water, which in the liquid form have considerable freedom of movement, have to occupy definite relative positions when the water assumes the form of ice. When pure water is cooled to  $0^{\circ}\text{C}$ ., the energy of the molecules is sufficiently diminished to allow attractive forces to come into play, under which the molecules assume the positions required for freezing, but the presence of particles of salt in the solution hinders this process, and the energy of the molecules of water must be diminished by a further reduction of temperature before solidification can take place. *See* Heat; Temperature; Thermometer.

**Freiberg.** Town of Germany, in Saxony. It stands on the river Munz-

bach, a tributary of the Mulde, 20 m. S.W. of Dresden, and is the mining centre of the Erzgebirge. Around are extensive silver and lead mines, while the town itself has an old and celebrated school of mines. Other industries are the manufacture of textiles, iron and brass goods, cigars, thread, chemicals, beer, and gunpowder. The chief building is the 12th century Gothic cathedral, restored in 1893, and containing a famous doorway, called the Golden Door, which has some magnificent sculptures.

S. Peter's church is noteworthy, and there are remains of the town walls, parts of which have been turned into promenades, a museum, a park, and several public monuments. The town grew up around the castle of Freudenstein, which became a residence of the dukes of Saxony. One of them rebuilt it in the 16th century, and this building remains. The silver mines, to which the town owes its existence, were opened about 1250. Pop. 36,237.

**Freiburg.** Small country town in Silesia. It is built upon a hillside, 36 m. S.W. of Breslau. There are manufactures of linen and watch-cases. Pop. 9,800.

**Freiburg-im-Breisgau.** Town of Germany, in Baden. It stands on the Dreisam, near the western borders of the Black Forest, 40 m.



Freiburg-im-Breisgau. The early Gothic cathedral with famous 13th century tower, 386 ft. high

S. of Strasbourg. Its older streets are narrow and almost ruinous, but there are numerous handsome modern thoroughfares, and some fine public buildings. The Gothic cathedral, known locally as the minster, is one of the most complete specimens of its kind, and its tower is celebrated for its delicate beauty of outline.

The university, founded in 1455, has an excellent library; there are a fine archbishop's palace, ducal palace, and merchants' house, and spacious botanical gardens. The principal manufactures are cotton-thread, sewing silk, paper, and chicory, and there is a fairly extensive trade in wine and timber. Long a possession of the house of Hapsburg, the town was on several occasions ceded to France, notably in the 17th and 18th centuries, finally becoming a part of Baden in 1806. Pop. 83,324.

**Freight.** Word derived from the Dutch, and meaning originally the burden or cargo of a ship. Hence it came to mean the rate paid for the carriage of goods by sea, and in this sense it is now chiefly employed. It is used in the U.S.A. for the carrying of goods by land, and railway freights is a common term, while a freight train is the equivalent of the goods train of Great Britain.

**Freiherr.** German title. It means free man or free lord, its origin being like that of baron. At first it was given to a man who held land, until in the 16th century the emperors began to bestow it as a mark of favour. All German sovereigns until 1918 retained the right to create *Freiherren*, who rank after the counts or *Grafen*. The title is hereditary. See Baron.

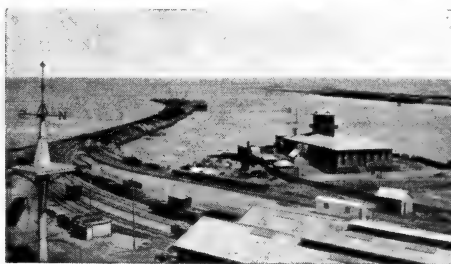
**Freiligrath, FERDINAND** (1810-76). German poet. Born at Detmold, Lippe, June 17, 1810, his first volume of poems appeared in 1838. Beginning with *Ein Glaubensbekenntnis* (A Confession of Faith), 1844, he wrote some of the finest of Germany's revolutionary songs. After the failure of the revolution, he was an exile in London, until the amnesty of 1866. He died March 18, 1876.

**Freising.** Town of Germany, in Bavaria. It stands on the left bank of the Isar, 18 m. N.N.E. of Munich, and its chief industries are the making of agricultural machinery, brewing, and printing. Its main interest is historic, as it was an important ecclesiastical centre in the Middle Ages. The cathedral, parts of which date from the 12th century, was restored and altered in the 17th century. There are several churches, including S. Benedict's, a Rathaus, and the

palace of the bishops, now a college. Near the town was a Benedictine abbey. Otto of Freising, the chronicler, was bishop here in the 12th century. Pop. 14,946.

**Fréjus** (anc. *Forum Julii*). Town of France in the dept. of Var. It stands on the Gulf of Fréjus, 22 m. S.W. of Cannes, and is an old Roman station containing many Roman remains. It has been an episcopal see since the 4th century, and parts of the cathedral date from the 12th century. A seaport of some importance in ancient times, the silting of the river Argens has now filled the harbour, and the town is a mile from the coast. Pop. 4,200.

**Fremantle.** Seaport of W. Australia. It stands at the mouth of the Swan river, 12 m. S.W. of Perth, with which it has rly. and river communication. It has a deep and well-equipped harbour, and is a port of call for European mail boats. Among the chief build-



Fremantle, Western Australia. The entrance to the harbour

ings are a fine town hall, institute, public library, and an asylum. Its industries comprise smelting, iron founding, sawmilling, and boat building, and there are flour mills, breweries, tanneries, and leather manufactures. Wheat is largely exported. The town is divided into three districts. Pop. 21,670.

**Fremantle, SIR EDMUND ROBERT** (b. 1836). British sailor. Born in London, June 15, 1836, he was a younger son of the 1st Lord Cottesloe. Educated at Cheam School, he entered the navy in 1849, and saw a good deal of service. He was in Burma in 1852, in New Zealand 1864-

66, and in Ashanti, where he was severely wounded, in 1873-74. In 1885 he became a rear-admiral; in 1886 he was made second in command of the Channel Squadron.

From 1888-91 he was commander-in-chief in the E. Indies; from 1892-95 in China, and from 1896-99 at Plymouth. In 1889 he was knighted, and he retired with the rank of admiral.

**Fremantle, SIR SYDNEY ROBERT** (b. 1867). British sailor. The eldest son of Admiral Sir E. R. Fremantle, he was born, Nov. 16, 1867. In 1881 he entered the navy and in 1903 became a captain. In 1915 he served in the Dardanelles, being in command of the Russell when she was sunk. Afterwards he was made deputy chief of the naval staff, from which he was transferred in 1919 to command a battle squadron of the Atlantic Fleet. He was then a rear-admiral. In 1919 he was knighted, and he has written on the science of his profession.

**Fremitus** (Lat. roaring noise). Vibrations produced in the chest when the patient speaks, and in certain abnormal conditions, such as some forms of pleurisy or catarrh, simply by breathing. They are detected by placing the palm of the hand flat upon the chest, and their presence or absence may form useful diagnostic signs of disease.

**Frémont, JOHN CHARLES** (1813-90). American explorer. Of French extraction, he was born at Savan-

nah, Georgia, Jan. 21, 1813. Graduating at Charlestown College, 1836, he accompanied a rly. survey party through Georgia, N. Carolina and Tennessee in 1837, and surveyed Nebraska, Dakota, Minnesota, and Iowa, 1838-40. From 1842-54 he explored Oregon, California, and New Mexico, in which states he made rly. surveys and did much to open up the far west to settlers.

A senator in 1850, he was nominated Republican candidate for the presidency in 1856, but his anti-

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Sir Sydney R. Fremantle, British sailor  
Photo, Russell



Sir Edmund Fremantle, British sailor  
Photo, Russell



J.C. Frémont

slavery sentiments angered the Southern states and he was defeated by Buchanan. In the Civil War, 1861, he was major-general in command of the W. division at St. Louis. The rly. crisis of 1873 ruined him financially, but he was governor of the territory of Arizona, 1878-82. He died in New York, July 13, 1890.

**Fremont's Peak.** Mountain of the Rocky Mts., U.S.A. In Wyoming, it is the highest point in the

Wind River Mts., being 13,790 ft. high. It was ascended in 1842 by John C. Frémont, hence its name. Fremont's Pass is in Colorado in the Rocky Mts. It is 11,300 ft. high.

**French.** River of Ontario, Canada. It has its source in Lake Nipissing, and flows nearly due W. to Georgian Bay, Huron Lake. Its length is 60 m., and it forms part of a projected scheme to connect this lake with the St. Lawrence river. See Georgian Bay Canal.

and the left wing in the battles east of Pretoria, June 10-12, 1900, and was in charge of the operations in the eastern Transvaal until the war ended in 1902.

French received a K.C.B. and K.C.M.G., and in Sept., 1902, was promoted to the rank of lieutenant-general with the Aldershot command, which he retained till 1907. He became known as a worker who spared neither himself nor his men. At the age of 55 he became full general, and in Dec., 1907, succeeded the duke of Connaught as inspector-general. He became A.D.C. to the king in 1911, and in March, 1912, succeeded Sir William Nicholson as chief of the imperial general staff, an appointment that caused some comment on the ground that General French, like his predecessor, had not been through the staff college. In 1913 he was made field-marshal. His reputation had grown even on the Continent, where he had repeatedly studied military operations.

#### The Expeditionary Force

French's career seemed to end in 1914, when he resigned, in consequence of the Government's action over the resignation of British officers at the Curragh Camp in connexion with the trouble in Ulster. On the first hint of the German threat, however, he was selected to lead the expeditionary force. Embarking with his staff on Aug. 14, he reached his own H.Q. at Le Cateau on Aug. 17. On Aug. 23 he was in contact with the enemy, the battle of Mons was fought, and the famous retreat began. It ceased on Sept. 5, and on Sept. 7 French ordered the advance across the Grand Morin river. The pursuit to the Aisne began and the armies there became static.

On Sept. 16 French deliberately came to the decision that frontal attack was hopeless, and began to urge the march to Belgium. as he wanted to prevent the Germans from capturing the Channel ports. His views slowly prevailed, though not in their entirety, and the terrible battle of Ypres opened on Oct. 19, ending successfully on Nov. 21, when the British troops defeated the German attempt to capture the salient. All this time and up to the close of the battle of Festubert in May, 1915, French had urged the supply of more and more ammunition, especially high explosive shells. He recorded the facts in his rather controversial autobiographical book entitled "1914." He saw the battle from a ruined tower, and was so overwhelmed by the contrast of ammunition supply of the contending

## J. D. P. FRENCH: EARL OF YPRES

Sir W. Beach Thomas, K.B.E., Special Correspondent of The Daily Mail

*This is one of the biographies of the military leaders in the Great War. See also Foch; Haig; Joffre; Pétain; Rawlinson; Mons; Ypres, and others of French's battles; also War, Great*

John Denton Pinkstone French was born at Ripple, Kent, Sept. 28, 1852, the only son of Captain French, R.N., member of a well-known Irish family, and of Margaret, daughter of William Eccles. At the age of 14 he entered the Britannia, but the navy did not appeal to him, and after four years as cadet and midshipman he left to join the militia; and in 1874 obtained a commission in the 8th Hussars, but soon transferred to the 19th. He became captain in 1880, in which year he married Eleanor Anna Selby-Lowndes. He received his majority in 1883.

In 1884 French saw active service for the first time. Proceeding to Egypt, he was attached to the force that was to relieve Gordon, started with the desert column in Dec., 1884, fought at Abu Klea, pushed through the Dervish army at Metemma; and after the death of Gordon endured the painful retreat across the Bayuda desert, Feb.-Mar., 1885. Promotion came steadily. He was lieutenant-colonel in 1885, and in 1889 obtained command of the 19th Hussars, which he left after four years to take up duties as assistant adjutant-general of cavalry. In 1897 he was given command of the 2nd cavalry brigade at Aldershot and was transferred in 1899 as temporary major-general to the command of the first cavalry brigade.

In the South African War French was given the command of the cavalry division in Natal with the full rank of major-general, and was one of the few officers who made a name in the war. In one of the earliest actions he drove the Boers from the station at Elandslaagte and fought the successful battle of that name. After several cavalry actions he saw that Ladysmith would be surrounded, and escaped by the last train. Through a great part of the war he kept the Orange Free State troops at bay in their

attempt to invade Cape Colony, and did wonders with a handful of troops and a few guns. As soon as



*French*  
Russell

Lord Roberts came out he gave French 5,000 men for the relief of Kimberley, which the force entered, after perhaps the most romantic gallop of the war. From Kimberley he galloped again with a tired remnant to cut off Cronje as he escaped from Paardeberg. He commanded the cavalry in the operations that ended in the capture of Bloemfontein and Pretoria,



armies that he told the whole story to Colonel Repington, military correspondent of *The Times*, whose dispatch caused in the sequel the fall of Asquith's government, and, in French's words, "the organization of the nation's industrial resources upon a stupendous scale."

French's military career had now reached its climax. He surrendered his command to Haig on Dec. 15, and in 1916 a viscounty was conferred on him. He became Viscount French of Ypres and High Lake, Roscommon, the residence of his ancestors since the opening of the 17th century. He took command of the forces in Britain until, in 1918, he was appointed viceroy of Ireland. He remained there through the troubled years following 1918, though rumours of his resignation were frequent, retiring in 1921. He was created an earl and took the title of Earl of Ypres. His heir is his elder son, Hon. John R. L. French (b. 1881). His younger son was wounded in 1917. French's many honours include the O.M. and the K.P.

**French Equatorial Africa.** Term including the three prov. of Gabun, Middle Congo, and Ubangi-Shari-Chad. The colony is bounded by the Cameroons on the W., the Anglo-Egyptian Sudan on the E., the Belgian Congo on the S., and the Atlantic Ocean on the S.W. French Equatorial Africa is administered by a governor-general, with headquarters at Brazzaville, and the three provinces are administered by lieutenant-governors residing at Libreville, Bangui, and Fort Lamy respectively. Each province has administrative autonomy and a separate budget, but there is also a general budget for the whole colony.

The resources of the colony are almost undeveloped, but it is extremely rich in forestal and tropical products, and in the far N. there are great cattle-grazing grounds. Communications are mainly along the waterways, the chief of which are the Congo, Ubangi, and Shari rivers, but native portage is necessary on the connecting tracks. The area, exclusive of those portions allotted to the Germans in 1911 and now again French territory, is about 900,000 sq. m. Pop. about 6,000,000, of whom about 2,000,000 are in the Chad military territory and about 1,500,000 in the rest of the Ubangi-Shari-Chad province. See Gabun; Middle Congo; Ubangi-Shari-Chad.

**French Horn.** Most important brass instrument used in the orchestra. It is of tenor compass, and of mellow, vocal tone. See Horn; Orchestra.



French Equatorial Africa. Map of the French Colony between the Congo and Lake Chad, with the territory ceded to Germany in 1911, and since regained as part of Cameroons

**French Polish.** Solution of gums or gum-resins employed to give a polish to wood. The process of producing the polish on the wood is known as french polishing. The composition of french polish varies according to the preference of the worker. Shellac is always the main ingredient, and the solvent is alcohol (spirits of wine, methylated spirit or finish). Finish is spirit denaturised by the addition of shellac (3 ozs. to a pint), so that it can be sold duty free and without the seller being licensed.

The simplest form of polish consists of a solution of 6 ozs. of shellac in a pint of spirit, but when other ingredients, such as mastic, sandarac, elemi, thus or benzoin are included in the formula, the quantity of shellac is correspondingly reduced. The gums and gum-resins mentioned are soluble in spirit if time be allowed, and if the bottle that contains the ingredients be kept in a warm place.

#### Polishing Process

The process of french polishing is really a series of operations consisting of (1) the preparation of the wood; (2) the polishing; and (3) the finishing. The surface of the wood is made as smooth as possible by glass-paper and sand-paper, and is then subjected to a process of

filing in the pores of the wood with a creamy paste of plaster of Paris or whiting and linseed oil. The filler is coloured according to the nature of the wood, using rose-pink for mahogany, brown umber for walnut, and yellow ochre for oak and other light woods. The colour of the wood is also darkened at this stage if desired by applying suitable colouring matters. The surface of the wood is again smoothed with sand-paper and the french polish applied. A pledget of woollen rag or cotton wool is saturated with the polish and enclosed in a piece of close-textured cotton fabric, so as to make a smooth, hard surface. A few drops of linseed oil and of polish are applied to the pad and rubbed on to the wood with a free, continuous and circular movement, taking care not to treat too large a surface at one operation.

The spirit evaporating during the polishing leaves a hard surface of shellac on the wood. The first polish is generally rubbed down with sand-paper, and the polishing repeated until a uniform surface is obtained. This is allowed to remain for a few days when the finishing process is carried out, i.e. wiping the surface with a small quantity of spirit.

## FRENCH REVOLUTION, 1789-1795

A. D. Innes, Author of *A General Sketch of Political History*

*This article deals with a special movement in French and European history. See the articles on Mirabeau; Robespierre, and the great figures of the Revolution; those on Directory; Feuillants; Girondists; Jacobins, etc. See also Europe; France; Louis XVI; Napoleon*

The French Revolution is the name given to that period of volcanic upheaval in France, usually reckoned as beginning with the meeting of the States-General in May, 1789, and closing with the establishment of the Directory in Oct., 1795. Its ideal was set forth in the three words Liberty, Equality, Fraternity. In form it was a terrific convulsion; its methods trampled its principles in the mire; it issued, not in democracy, but in Caesarism. Nevertheless it undermined the foundations of the old order of privilege, and inaugurated the long struggle for the political, social, and economic emancipation of the masses of the European population.

France in 1788 had reached the stage at which drastic reforms had become a sheer necessity; failing reforms, the only possible alternatives were a stormy revolution or the establishment of an irresistible tyranny. Her political system, consummated under Louis XIV, was an uncompromising absolutism which allowed the people no share whatever in the government. The king ruled through ministers whom he appointed or dismissed at his own pleasure—ministers nearly always chosen from the aristocracy.

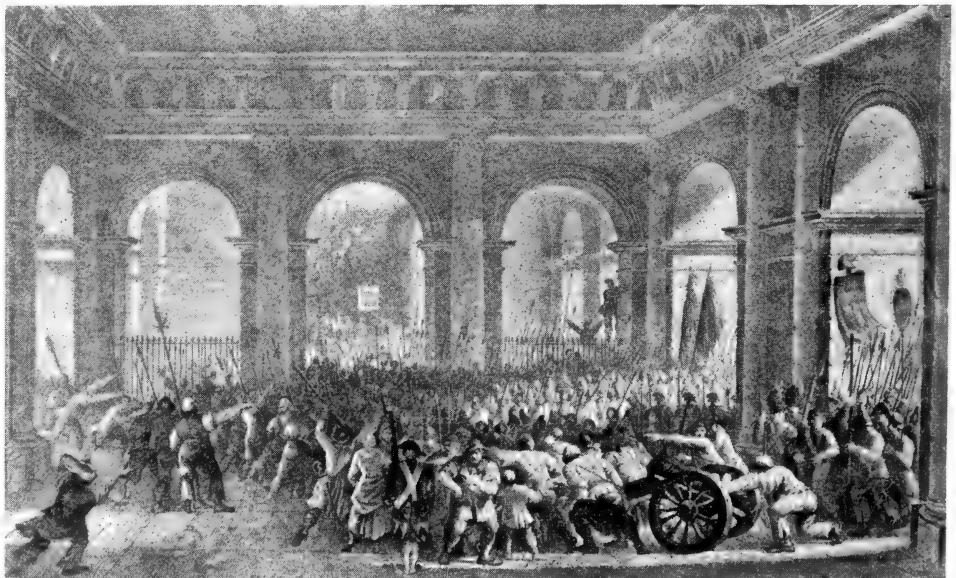
and responsible to no one save to the king himself. Socially, the population was divided into rigid castes, forming primarily three groups, the *noblesse* or aristocracy of birth, the clergy, and the commons. In France all the members of a noble family remained of the *noblesse*, not commoners at all, from generation to generation. The clergy were separated from the rest not by birth, but by the rule of celibacy and by their sacred functions.

In the towns there was a middle class—the *bourgeoisie*, professional men and traders—and a working class; in the country districts the peasantry were virtually the serfs of the *seigneurs*, the landed proprietors who owned the soil, to whom they were legally bound to render payments and unpaid services, and who exercised a broad jurisdiction over them. Economically, *noblesse* and clergy were almost exempt from taxation. The whole burden of providing the national revenue, the cost of the court, of war, of administration, was on the shoulders of the commons, and pressed most heavily upon the peasantry who were least able to bear it. There was no liberty of the individual.

But the seeds of change had been sown by the "intellectuals." The mockery of Voltaire had shattered the sense of reverence for conventions. The writers in the Grande Encyclopédie, D'Alembert, Diderot, and others, had challenged all the principles upon which the social and political structure was based. Jean Jacques Rousseau had propounded palpably revolutionary doctrines, notably in his *Contrat Social*, teaching that the organization of society rested upon an original contract imposed by the strong, for their own interest, upon the weak, claiming that the ultimate authority is the Will of the People, and insisting upon "natural rights," the Rights of Man.

With a light heart France, in order to injure England, had taken the part of the Americans, and French aristocrats, unconscious that they were sporting on the crater of a volcano, played gaily at advocating those same revolutionary ideas. Meanwhile, France was rushing towards bankruptcy, the result of accumulated expenditure upon wars of aggression from which there had been but very brief respites during the last century and a half.

The immediate cause of the cataclysm was this financial chaos. The crushing burden of taxation and forced labour imposed upon the unprivileged classes, the obvious need for reorganization, the opposition persistently offered to any



French Revolution. The mob invading the Tuileries palace in an attempt to intimidate the king and queen, June 20, 1792

From a drawing in the Louvre, Paris

reorganization by the privileged classes, the disastrous failure of a succession of incompetent ministers to discover any remedy for the chaos, led to the suggestion that the Government should consult the nation by summoning an Assembly of the three estates, *noblesse*, clergy and commons, an obsolete form of a National Assembly which had not been called together for the best part of two centuries.

In Jan., 1789, the States-General was summoned. At the beginning of May it assembled, the Third Estate, or commons, appearing by its elected representatives, among whom were included a sprinkling of aristocratic sympathisers. It was apparent that, if the three estates voted as separate chambers, as the government intended, the two privileged chambers would be in permanent agreement, resolved to



French Revolution. Enrolling volunteers to serve in the Revolutionary armies

*From a picture by Vinchon, at Versailles*

14 the mob marched upon the Bastille, the fortress-prison which

Armed Paris organized itself as the National Guard. The fall of the Bastille was hailed as typifying the fall of the old order. The National Guard was placed under the command of the popular nobleman Lafayette; it adopted the tricolour for its colours. All over the country mobs rose, and the down-trodden peasantry turned their fury upon the châteaux of the seigneurs, while payment of taxes was refused. The whole machinery of government had broken down, though some semblance of order was preserved by the efforts of the middle classes and by the organization in the provinces of National Guards after the Paris model.

On the other hand the king, Louis XVI, a man hopelessly lacking in insight, but with the best of intentions and abundant personal courage, won a moment's popularity by boldly presenting himself in Paris, obviously at the risk of



French Revolution. Roll call of the last victims of the Reign of Terror, 1794. The seated figure in the centre is André de Chénier, who wrote his most famous poems in the prison of Saint-Lazare

*From a picture by C. L. Müller, at Versailles*

surrender no fraction of the privileges which in their view constituted the safeguards of society. The voice of the Third Estate would count for nothing unless all the chambers voted together, giving the preponderant voting power to the preponderant numbers of the Third Estate.

This was the first battle-ground, and the fight was won by the Third Estate, led by the aristocrat Mirabeau. Its delegates assumed the title of the National Assembly, and were joined by many of the representatives of the lower clergy. The sympathies of the whole population of Paris and the whole rank and file of the soldiery were with them. An appeal to force was too dangerous to be attempted; the government gave way and the Estates were constituted as a single chamber.

The court sought to save itself and to overawe Paris by means of mercenary regiments, Germans and Swiss. Paris armed itself; on July

stood as the material embodiment of the old system, and stormed it.



French Revolution. The arrest of Robespierre amidst the turmoil and strife of the night of 9-10 Thermidor, 1794

*From a contemporary print*

his life, and mounting the tricolour cockade. Popular hostility, however, was directed not against him but against the arrogance and the privileges of the *noblesse*. These, the enthusiasts declared, were at the root of the woes of France; and on Aug. 4 the National Assembly decreed the abolition of the whole mass of the obnoxious privileges; after which it set about formulating a constitution, taking to itself the title of the Constituent Assembly.

While the Assembly continued its work of wholesale abolition and wholesale reconstruction, the king was kept virtually a prisoner in Paris; numbers of the nobility were fleeing or had already fled into a voluntary exile in the hope of eventually recovering their lost privileges by force; and outside the Assembly was organized the political association of reformers known as the Jacobin Club, which derived its name from its meeting place, the Dominican or Jacobin convent of the Rue S. Jacques. The club, affiliating to itself similar clubs all over the country, became a great political power.

#### Death of Mirabeau

It is conceivable that Mirabeau, if the court party had placed itself unreservedly in his hands, might have succeeded in effecting a reconstruction combining a monarchical executive with a democratic legislature, capable of providing a strong government with popular sympathies; but the court party had few ideas apart from striving to paralyse the activities of the Assembly, in which they were aided by the extremists of the other wing. The last chance, such as it was, perished with the death of Mirabeau on April 2, 1791. The king, finding himself helpless, resolved upon flight. He attempted to execute the design (June), but was detected and stopped at Varennes as he was nearing the frontier, and was brought back.

The flight to Varennes and the documents which Louis had left behind made it clear that the king was antagonistic to the constitution which had been designed, also that it was probable he would seek to evade it or overturn it. There was more than excuse for the suspicion that he and his wife, Marie Antoinette, if they had crossed the border, intended to appeal to the crowned heads of Europe and more particularly to the queen's brother, the emperor Leopold II. The *émigrés*, the fugitive *noblesse*, notable among whom was the king's brother, the count of Artois (afterwards Charles X), were already clamouring for armed intervention from abroad.

Leopold, in conjunction with the king of Prussia, issued the declaration of Pilnitz—a warning that the Powers could not recognize the existing French government until the reinstatement of the king, and threatening intervention should the Powers be unanimous—a perfectly safe threat, since Leopold knew that the Powers would not be unanimous. On the other hand, the declaration was calculated to silence the *émigrés*.

#### The Legislative Assembly

Meanwhile in France the more advanced democrats were calling for the deposition of the king, even for the declaration of a republic. Moderates like Lafayette, men who two years before had been regarded as the leaders of the advance guard, rallied to the monarchy and urged on the king the adoption of the constitution promulgated by the Assembly. His acceptance reinstated him as king, with limited powers. The constitution provided for the appointment of a new Legislative Assembly in which all members of the National Assembly were prohibited from sitting.

The members of the National Assembly had at least attained some experience of administrative functions; the members of the new Legislative Assembly were without experience at all, and were for the most part doctrinaire republicans. On the reinstatement of the monarchy the declaration of Pilnitz was withdrawn. But it had had a fatal effect upon which Leopold had not calculated. Its subtle intention was misunderstood in France, and it was regarded simply as an insolent attempt on the part of foreign Powers to dictate to France on a domestic question with which they had no concern.

In the Assembly there were three main groups besides the infinitesimal sprinkling of thorough-going royalists: the Feuillants or Constitutionalists, the Girondins, who came from the department of the Gironde and may be described as literary republicans; and the ultra-democrats, now identified with the Jacobins. The Feuillants and the Girondins were both disposed to adopt a highly aggressive attitude towards the foreign Powers and the *émigrés*. Louis found himself forced to discard his royalist ministers and put Girondins in their places. Though the Jacobins held aloof, for which the leaders outside, Danton and Robespierre and Marat, had their own reasons, Louis was compelled to declare war upon Austria at the moment when the emperor Leopold died

and was succeeded by Francis II (March, 1792).

Dumouriez, the new war minister, had again developed Louis XIV's conception that the borders of France should be extended to her "natural boundaries," the Rhine, the Alps, and the Pyrenees. Patriots hastened to join the as yet ill-organized armies on the frontiers. Ill-success was attributed to the aristocratic officers. Riots broke out in Paris, the mob invaded the Tuileries and insulted the king and the royal family. Prussia declared war in alliance with Austria—it must be remembered that at this time the Netherlands belonged to Austria, and the modern Belgian frontier was then the Austro-French frontier. The duke of Brunswick, on behalf of Prussia, issued a threatening manifesto which filled Paris with wrath. The Jacobins had captured the Commune (the government of Paris), and virtually dominated the Legislative Assembly.

#### The Victory of Valmy

The prisons were crowded with suspects, persons supposed to be under suspicion of collusion with the *émigrés*. The advance of the Prussians created a panic; there was a widespread belief that there was a royalist plot for a royalist insurrection in Paris. The Commune organized a visitation of the prisons, and in the September Massacres hundreds of captives were slaughtered. Simultaneously came the news that the Prussians had been checked in an engagement at Valmy. From that time the armies of the Republic habitually proved themselves more than a match for their enemies.

With the close of Sept. the Legislative Assembly gave way to a new National Convention, part Girondist, part Jacobin, and altogether Republican. It proceeded at once to declare that the monarchy was abolished and a Republic established, and all populations in districts occupied by French troops were proclaimed freed from the monarchies under which they were supposed to have groaned. The French Republic had assumed the character of an aggressive champion of the Liberty which it was determined to impose upon the peoples of Europe in a general war against monarchy. It clinched its position by repudiating treaties, finally challenging England by declaring the opening of the navigation of the Schelde and by throwing down the head of a king as its gage of battle to the kings of Europe. Louis was brought to a sort of trial, and was beheaded Jan. 21, 1793.

Then, while French armies were achieving successes against their enemies beyond the frontier, the parties in Paris fell to devouring each other. The Girondins had now become the party of moderation; the Jacobins won the supremacy, drove them from office, and sent many of them to the guillotine. A Committee of Public Safety was organized which wielded despotic power; its emissaries accompanied the armies, and were scattered all over the country, none daring to dispute their behests. While one of the members, Carnot, was sufficiently occupied as the war minister organizing victories, the Reign of Terror was instituted, and the guillotine devoured its victims in numbers that increased week by week from scores to hundreds. On July 13 Marat was slain by Charlotte Corday, but his death made no difference. The mere accusation of being well affected to the aristocrats was the almost unflinching precursor of imprisonment and death.

On Oct. 16, 1793, Marie Antoinette, the widow of Louis, who had died with kingly calm and dignity, followed her husband to the scaffold. A month later the guillotine claimed among its victims Marie Roland, the heroine of the Girondists. Day by day the tumbrils rolled through the streets of Paris; in the provinces like scenes, and scenes even more repulsive, were enacted.

#### The Fall of Danton

Danton the inexorable, who shrank from nothing when he deemed that the cause of Liberty would be furthered by frightfulness, sickened of the purposeless slaughter; even Robespierre was nauseated by the vulture flock that was headed by the detestable Hébert. Suddenly he turned on them, and on March 24, 1794, Hébert's own head fell. But Robespierre was minded for no more concessions to the Indulgents, the group of whom Danton, weary of bloodshed, was the leader; his own ascendancy was at stake; on April 5 the great Tribune was struck down. But the carnival of blood was no longer to be endured. A conspiracy was organized. Suddenly, on July 27, Robespierre himself was seized, and on the following morning he was beheaded. With his death and the execution of his partisans which immediately followed, the Reign of Terror was ended.

It remained to evolve one more constitution, a constitution which was to place the administration in the hands of a Directory of five, while legislation was to be entrusted to two Assemblies. This scheme, arrived at a year after

the fall of Robespierre, did not command universal assent, especially in Paris. But the government was prepared for an insurrection, and when it came they had entrusted the arrangements for its suppression to a young officer of artillery, Napoleon Bonaparte. His success was complete. The Directory was established by the *coup d'état* of Vendémiaire (Oct. 5, 1795), and Bonaparte was rewarded with the command of the armies of the Republic in N. Italy. Four years were to pass before another *coup d'état* made the young general First Consul, and in effect transformed the French Republic into a military monarchy. Not till 1871 was a republic to be permanently established in France.

#### Results of the Revolution

But the meaning of the French Revolution is not to be tested by its success or its failure in establishing republican institutions. Republicanism was only one of its accidents; the basic principles on which it rested are no less compatible with a constitutional monarchy than with a republic. Essentially, its political demand was for the "government of the people for the people by the people"; the movement assumed its terrific character because it arose when nearly all the peoples of Europe were governed mainly in the interests of particular classes by absolute rulers. It did not succeed in establishing anywhere the practice of "government by the people"; in Europe generally the force wielded by governments, not by the people, was too strong for them to be readily overthrown, and the actual excesses perpetrated in France checked for the time the moral forces which would naturally have been thrown into the scale on the side of Liberty. But a spirit had been aroused which, though it might be sternly repressed, could never again be completely allayed.

If the French people were still willing to submit themselves completely to a master who could be idealised as a hero, it had yet become impossible after the Revolution to lay upon them the old yoke, to subject them to the absolutism of an hereditary prince or the domination of an hereditary caste. Everywhere the Revolution forced upon privileged and unprivileged classes alike the consciousness that the unprivileged have rights which cannot altogether be ignored, that revolution will always lurk under the throne of tyranny; the peoples of Europe owe it to the French Revolution that,

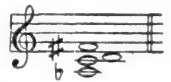
however slowly and gradually, they have yet won in a greater or less degree a hearing for themselves in their own governments.

The French Revolution was the direct cause of the great movement which has turned South America into a group of self-governing states instead of a congeries of provinces administered as the estates of an absolute monarch. Politically, the feudal system of the Middle Ages had perished long before; as a social system it had remained rampantly dominant. As a social system the Revolution shattered it—utterly among the Latin peoples, though not so completely elsewhere. However we may shudder at the methods which the Revolution employed, at a time when elemental forces broke loose which no man could control, its fundamental principles have become part and parcel of the creed of civilized humanity. See Bastille, *illus.*

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**French Sixth.** In music, chromatic chord consisting of a bass note with a major third, augmented fourth, and augmented sixth above it:

It belongs to the key of its major third—in this case C—but it can be used also in other keys. The origin of the name is uncertain. See Chromatic; Interval.



**Frensham.** Village and parish of Surrey, England. It is  $3\frac{1}{2}$  m. S. of Farnham, and is noted for its two lakes or ponds. The larger of them covers 90 acres and is visited for boating and fishing. The church of S. Mary, restored in 1866, has some interesting features, parts of it being Early English. Frensham Common is a large open space, used by the military for manoeuvres and the like. Pop. 3,272.

**Frenssen, GUSTAV** (b. 1863). German novelist. Entering the Church as a young man, he became a country pastor. His first work, *Die Sandgräfin*, appeared in 1896, and was followed two years later by *Die drei Getreuen*. Jörn Uhl, 1901, was a great success and was followed by a series of novels. After 1902 he gave up his cure and devoted himself to literature.



**Frequency OR PERIODICITY.**

The number of complete double reversals per second of an alternating electric current. It ranges from 10 to 100,000 or more in different kinds of apparatus. *See* Generator; Induction Coil; Wireless Telegraphy.

**Frere, JOHN HOOKHAM** (1769-1846). British diplomatist and translator Born in London, May 21,



**John Hookham Frere,**  
British diplomatist  
*After J. Hoppner*

1769, eldest son of John Frere (1740-1807), the antiquary, he was educated at Eton, where he began his friendship and literary collaboration with George Canning, and at his father's college (Caius) at Cambridge, of which he was fellow 1793-1816. He entered the foreign office, and in 1796-1802 represented West Looe in the House of Commons. He was foreign under-secretary, 1799; envoy to Lisbon, 1800-2; minister at Madrid, 1802-4; privy councillor, 1805; and minister to Spain again, 1808-9, being recalled after the retreat of Moore to Corunna. He settled in 1818 at Malta, where he died, Jan. 7, 1846, being buried in the English cemetery beside his wife.

Frere, who twice refused a peerage, as a writer sought more the critical approval of the few than the applause of the public for his work. While at Eton he joined Canning and others in promoting *The Microcosm*, 1786-87; and displayed a remarkable power of writing in the style of the ancient ballads. He was one of the founders of *The Quarterly Review*. His pungent wit and metrical facility show to advantage in his renderings of *The Acharnians*, *Knights*, *Birds*, and *Frogs*, of Aristophanes, 1840. Byron was indebted to him for the ottava rima of *Beppo*. *See* Works, with memoir by W. E. and Sir Bartle Frere, 1872; the *Translations of Aristophanes*, with intro. by W. W. Merry, 1907.

**Frere, SIR HENRY BARTLE EDWARD** (1815-84). British administrator. Born at Clydach,

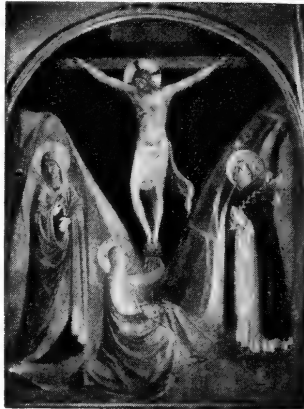


**Sir Bartle Frere,**  
British administrator

Brecknockshire, March 29, 1815, and educated at Bath Grammar School and Haileybury, he entered the Bombay civil service in 1834. For his

services during the Mutiny he received the thanks of both Houses of Parliament, and was created K.C.B. He was governor of Bombay from 1862-67, and after accompanying the Prince of Wales to India, received a baronetcy in 1876.

In 1877, he was appointed gover-



**Fresco. The Crucifixion, and, above, Christ received by two Dominican monks, painted in fresco by Fra Angelico in S. Mark's, Florence**

nor of the Cape, and high commissioner for the settlement of native affairs in S. Africa, with a view to the confederation of the S. Africa colonies. His action in relation to the Zulu War was censured by the Government, his conduct of affairs in India and Africa was violently assailed by Gladstone in the Midlothian campaign, and he was recalled in 1880. The justification of his action is contained in his Correspondence relating to the Recall of Sir Bartle Frere, 1880, and in *Afghanistan and South Africa: a Letter to the Right Hon. W. E. Gladstone*, 1881. He died, May 29, 1884, and was buried in S. Paul's. A monument to him, on the Thames Embankment, was unveiled by the Prince of Wales in 1888, and a "house" at Haileybury College was named "Bartle Frere" in his honour. *See* Life and Correspondence, John Martineau, 1895.

**Frère-Orban, HUBERT JOSEPH WALTER** (1812-96). Belgian statesman. Born at Liège, April 24, 1812, he adopted the legal profession, and in 1847 was elected deputy for his native city. Minister of

finance, 1848-52, he introduced various reforms, reduced postal rates and advocated free trade. He was prime minister, 1868-70, and was again in power from 1878-84, carrying through many educational reforms. Leader of the opposition until 1894, he died, Jan. 2, 1896.

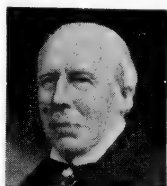
**Frere Town.** Settlement of Kenya Colony. It stands on the mainland, opposite Mombasa, and was named after Sir Bartle Frere. Here is a station of the Church Missionary Society, founded in 1874, with schools and hospital.

**Fresco** (Ital., fresh). Method of painting in water colour upon fresh mortar. It was the favourite process of mural decoration before the introduction of oil painting. The plaster must be fresh in order to absorb the colour, and since it dries rapidly, the artist must work with great dexterity, decision, and speed. The wall must be free of saltpetre, and only such colours can be employed as are not affected by lime—a limitation which excludes certain of the most brilliant greens, reds, and yellows.

The artist first of all drew a cartoon (*q.v.*), and then transferred it piecemeal to as much fresh plaster as he could cover "at a sitting." The palette was dispensed with because it could not hold enough colours, and pots of different colours were used instead. Though regarded as a process of water-colour painting without agglutinants, size, or white or yolk of egg was required to fix certain colours. Theoretically, fresco should last as long as the wall which it adorns, but meteorological conditions are vital, a damp climate being fatal. *See* Painting.

**Freshfield.** Cape or promontory on the coast of King George V Land (*q.v.*), Antarctica. It is in lat. 68°-69° S., and long. 151° E., and separates Cook Bay from Deakin Bay. Discovered by the Mawson Expedition of 1911-14, it was named after the English explorer and mountaineer, D. W. Freshfield.

**Freshfield, DOUGLAS WILLIAM** (b. 1845). British traveller. Born April 27, 1845, and educated at



**D. W. Freshfield,  
British traveller**

*Elliot & Fry*

In 1899 he made an expedition to Sikkim, and journeyed round Kangchenjunga. He travelled in Uganda, Syria, Algiers, Caucasus, Armenia, etc. Member of the Council of the Royal Geographical Society in 1878, he was vice-president 1906-13, and president 1914-16. He was president of the Alpine Club, 1893-95, and chairman of the Society of Authors, 1908-9. He has published several books of travel, notably *Travels in the Central Caucasus and Bashan*, 1869; *The Italian Alps*, 1875; *Round Kangchenjunga*, 1903.

**Freshwater.** Parish and watering-place of the Isle of Wight, England. It stands on the river Yar,  $1\frac{1}{2}$  m. S.W. of Yarmouth. It is the terminus of the I.W. Central Rly. Its parish church, built on the site of an older edifice, retains a Norman doorway, a 12th century arcade, and a memorial brass of 1390. Lady Tennyson was buried here. Freshwater cliffs attain a height of nearly 500 ft. Lord Tennyson resided for some time at Farringford House, in the neighbourhood, and a monument is erected in his memory on High Down. Pop. 3,192.

**Fresh-water Deposits.** Rocks containing fossil remains of fresh-water organisms, chiefly molluscs and plants. They occur most frequently in secondary and tertiary formations. In secondary rocks the fossil molluscs belong to types still living in fresh waters (e.g. *Limnæa*, *Planorbis*, *Unio*). Remains of land-mammals, reptiles, and land-plants are also found in these beds. The Old Red Sandstone with fossil mussel-like shells, and fish of ancient type, showing similarities to the *Polypterus* at present inhabiting the Nile, is a notable example of fresh-water deposits of the primary period.

The Purbeck beds, including as fossils remains of fresh-water shells, ostracods, and mammalian bones and teeth, are a secondary deposit of this type. In the Tertiary (Oligocene) rocks of Isle of Wight occur fossils of similar affinities. Many

fresh-water limestones, as in Isle of Wight, have been formed by action of lowly plants (*Chara*), which secrete lime contained in the water. Fresh-water deposits are often of great thickness, but having been laid down in lakes and estuaries, are of limited extent in comparison with the vast areas of marine deposition. See *Geology*; *Rocks*.

**Fresnel, AUGUSTIN JEAN** (1788-1827). French physicist. Born at Broglie on May 10, 1788, he worked first as an engineer, and later made researches in optics, doing valuable work in connexion with the undulatory theory of light. He deduced the mathematical results of Thomas Young's experiments, and explained the interference of polarised as well as ordinary light. He died July 14, 1827.

**Fresnes.** Name of several villages of France prominent in the Great War: (1) in dept. of Pas-de-Calais, 4 m. S. of Drocourt, notable in the third battle of Arras, April-May, 1917, and captured by the British, Oct. 8th, 1918. (2) in dept. of Meuse, known also as *Fresnes-en-Woevre*. It is near Les Éparges and N. of S. Mihiel. It was conspicuous in the French operations in the S. Mihiel salient, April, 1915, and was captured by the 4th U.S. div., Sept., 1918; (3) in dept. of Nord,  $5\frac{1}{2}$  m. N. of Valenciennes, captured by the British, Nov., 1918; (4) in dept. of Somme, 3 m. N. of Chaumes, and 7 m. S.W. of Péronne. Captured by the French in the spring of 1917, it was re-taken by the Germans in the spring of 1918, and was re-captured by the Allies in the autumn of 1918. See *Arras*, Third battle of; *Sambre*, Battle of the.

**Fresnillo.** Town of Mexico, in the state of Zacatecas. It stands on the slopes of the Cerro del Proaño, about 7,000 ft. above sea-level, and is 36 m. N.W. of Zacatecas by the Mexican Central Rly. The chief industry is the working of the silver and copper mines, discovered in the middle of the 16th cent.; agricultural pursuits and stock-rearing are engaged in. Pop. 6,750.

**Fresno.** City of California, U.S.A., the co. seat of Fresno co. It lies in the valley of the San Joaquin, 200 m. S.E. of San Francisco, and is served by the Atchison, Topeka, and Santa Fé and the Southern Pacific rlys. Irrigation is largely resorted to in the neighbourhood, which produces grain and grapes in considerable quantities. Petroleum is obtained, and mining and stock-rearing are carried on. The chief industrial establishments include preserved fruit, wagon, and macaroni factories, flour mills, and an oil refinery. The federal

building, a city hall, and a public library are notable buildings. Founded in 1872, Fresno received a city charter in 1885. Pop. 28,810.

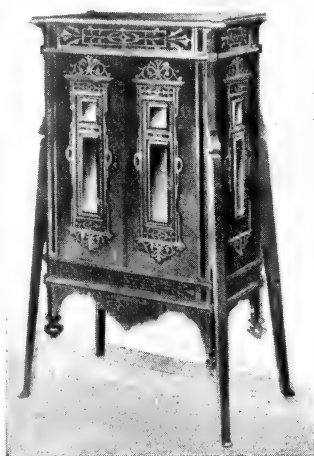
**Fresnoy.** Village of France in the dept. of Pas-de-Calais. It is 4 m. S.E. of Lens, and slightly N. of Oppy. Captured by the 1st Canadian div., May 3, 1917, it was retaken by the Germans on May 8, and finally regained by the British, Oct. 6, 1918. Fresnoy-le-Grand is 5 m. N.E. of St. Quentin in the dept. of Aisne. It was captured by the Allies in the great offensive of the autumn of 1918. Fresnoy-les-Roye, near Roye, was the scene of heavy fighting Aug. 13-20, 1918. See *Arras*, Third Battle of; *Le Cateau*, Second Battle of.

**Fret.** In heraldry, masle interlaced by a cotice and a baton. A shield fretty is covered with a trellis or interlaced diagonal bands. The trellis may be nailed or cloué. See *Ordinary*.

**Fret.** Little ridge upon the fingerboard of some stringed instruments to mark the point at which the player's finger must shorten the vibrating length of string to produce a certain note. On the violin and its larger relatives the fingerboards are plain, and the player's sense of position and pitch is his sole guide; but the older viols had fretted fingerboards, as have also the popular plucked instruments such as the lute, mandolin, guitar, and banjo. See *Fingerboard*.

**Fretwork** (O.F. *frete*, trellis work). Carved woodwork in perforated patterns. The wood used should be of fine grain, such as satinwood, walnut, lacewood, sycamore, lime or maple. The strongest is three-ply, being made of three sheets of thin veneer rolled and cemented together, the grain of the middle sheet crossing that of the others. The usual thickness is a quarter inch, though inch thick wood is used sometimes.

The chief tools are a saw, drill, and bradawl; a fret-saw board and carving board being also necessary. The former is a piece of ordinary wood with a V-shaped opening at the front which allows the saw to be moved freely. The buhl saw, chiefly used, is a three-sided frame of steel or wood, of which the fourth side is formed by the saw, often no thicker than a thread. The wood to be carved being placed on the sawing-board, a hole having been drilled through it, the saw, detached at one end, is passed through the hole, then refastened in its frame to work from that centre. A fret-machine is an elaboration of the saw and allows both hands to be free for the necessary



guidance. Fretwork in wood became popular for amateurs between 1870-80; but metal cutting, a branch of fretwork, for which the same method and tools are used, is of earlier origin. In architecture fretwork is the carved ornament, consisting of intersecting lines in relief, used as ceiling decoration. *See* Buhl.

**Freud, SIGMUND** (b. 1856). Austrian scientist. Born at Freiberg, Moravia, May 6, 1856, he was educated in Vienna, and after studying in Paris and elsewhere, was appointed professor of the therapeutics of neurotic diseases at Vienna.

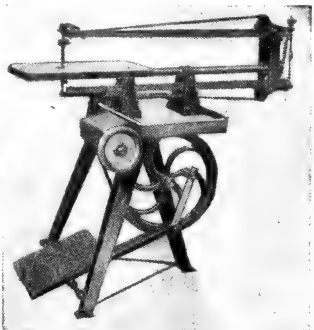


Sigmund Freud,  
Austrian scientist

Freud made the discovery that many neurotic affections such as hysteria were due to a conflict between the conscious and the unconscious parts of the mind, the conscious endeavouring to act in conformity with social training and the restraints of civilization, while the unconscious was endeavouring to find an outlet for primitive tendencies which had been suppressed or partially suppressed by the patient. By gradually bringing the suppressed material into consciousness so that the patient understood his mental conflict, the symptoms were found to disappear. For this purpose Freud devised the method known as psycho-analysis, a process which may be employed in investigation of any form of fantasy, but is most often applied to dreams, which Freud considers represent in a disguised and symbolic manner the gratification of suppressed wishes. Freud's chief works which have

been translated into English are: *Selected Papers on Hysteria*, 1895, 2nd ed. 1912; *Interpretation of Dreams*, 3rd ed. 1913; *Delusion and Dream*, 1917; *Psychopathology of Everyday Life*, 1901, new ed. 1914; *Three Contributions to the Theory of Sex*, 1905, 3rd ed. 1918; *Totem and Taboo*, 1913, new ed. 1919. *See* *Dream*; *Psycho-analysis*.

**Freudenstadt** (Ger., town of joy). Town of Württemberg, Germany. It stands on the river Murg, 40 m. S.W. of Stuttgart. It has



Fretwork. Treadle iron-saw. Above, cabinet made entirely of fretwork

*By courtesy of Hobbies, Ltd.*

some small manufactures and a trade in timber; owing to its mild climate it is a health resort. There is a Rathaus and a remarkable old church consisting of two naves at right angles to each other, restored in the 19th century. The town has a theatre, baths, and other attractions for visitors. It was founded in 1599 by the duke of Württemberg for Protestants driven from Salzburg. Pop. 8,000.

**Freyberg, BERNARD CYRIL** (b. 1890). British soldier. Born in London, he was educated at Wellington College, New Zealand, and became a lieutenant in the N.Z. territorial army. On the outbreak of the Great War he came to London, and joined the R. Naval Division, serving at Antwerp, the Dardanelles, and in France (1914-18). He won the D.S.O. in April, 1915, in the Gulf of Xeros, and the V.C. for brilliant leading on the Ancre, Nov., 1916, where he organized the attack on Beaumontcourt. He was brigadier-general with the 29th division, 1917-18. *See* Beaumont-Hamel.



Bernard C. Freyberg,  
British soldier

**Freycinet, CHARLES LOUIS DE SAULCES DE** (1828-1923). French statesman and engineer. Born at

Foix, Nov. 14, 1828, he became chief engineer for the Midi Rly. in 1856. Prefect of the dept. of Tarn-et-Garonne, and assistant to Gambetta at the ministry of war, 1870, he retired after the armistice, but was elected senator for the Seine dept. in 1876. He was minister of public works in two ministries between 1877-79, president of the council and foreign minister, 1879-80 and in 1882 and 1886, foreign minister under Brisson, 1885-86 (when his life was attempted, Oct. 29, 1885), and minister of war in six different cabinets between 1888-99. In 1882 he was appointed inspector-general of mines.

No statesman held office more often under the third republic, and Freycinet's record included extensive reorganization of the rly. and canal systems of France, and reforms in the administration of French protectorates, and in the war office. The author of many books on scientific and political matters, he was elected to the French Academy in 1890. He died on May 15, 1923. *Pron.* Fraysineh.

**Freyja**. Goddess of love and healing in Norse mythology. Two white cats drew her chariot and she could fly in a magic feather skin. Her house in Asgard was Folkvang, where she received the souls of half the slain from Odin. She wept tears of gold for her absent husband, Odr.

**Freyr** or **FREY**. Norse god of rain, sunshine, and fruitfulness, especially worshipped in Sweden. Brother of Freyja, his house in Asgard was Alfheim. He possessed the Sword of Victory and also Skidbladna, a ship which could carry all the gods and yet be folded into his bag. He gave away the sword to win Gerda, a giant maiden, and thus was conquered in the last great fight.

**Freytag, GUSTAV** (1816-95). German novelist and dramatist. Born at Kreuzberg, Silesia, July 13, 1816, he studied philosophy at Breslau and Berlin, and taught for a time in Breslau University. Removing to Berlin, he edited *Die Grenzboten*, 1847-61. His comedy



C. L. de Freycinet,  
French statesman



Gustav Freytag,  
German novelist

Die Journalisten (The Journalists), 1853, and Soll und Haben, 1855 (Eng. trans. Debit and Credit, 1857), dealing with middle-class life, established his fame.

In 1864 came Die Verlorne Handschrift (The Lost Manuscript), a successful description of the university life of the day. In the six parts of Die Ahnen (The Ancestors), 1872-80, he traced in a cycle of tales the evolution of the German social character. The first part was translated into English as Our Forefathers, 1873. He died at Wiesbaden, April 30, 1895.

**Freytag-Loringhoven**, ALEXANDER, BARON VON (b. 1849). German soldier and writer. Born at



Baron von Freytag-Loringhoven, German soldier

Rio de Janeiro, May 5, 1849, he belonged to an old Prussian family; his father was a diplomatist. He was educated at the universities of Dorpat and Berlin, entered the army in 1868, and served in the Franco-Prussian War. He became quartermaster-general in the field when Falkenhayn was chief of staff (1915-16). Later he was appointed deputy-chief of the general staff in Berlin. In 1917 he published Deductions from the World War. It was a candid explanation of the German failure and mentioned the methods by which Germany proposed to win "the next war."

**Frezenberg**. Village of Belgium, in the prov. of W. Flanders, 3 m. E. by N. of Ypres. Conspicuous in the fighting in the Ypres salient in the Great War, it was the scene of a big German attack, May 8-9, 1915. A few days before, the Allied line had been withdrawn to the Frezenberg ridge, which commanded all the roads from Ypres by which men and stores were brought to that part of the salient. Yielded up to the Germans in April, 1918, it was finally retaken in the battle for the Belgian coast in the autumn of 1918. See Ypres, Battles of.

**F.R.G.S.** Abbrev. for Fellow of the Royal Geographical Society.

**F.R.H.S.** Abbrev. for Fellow of the Royal Horticultural Society and Royal Horticulcultural Society, which are sometimes written F.R.Hist.S. and F.R.Hort.S.

**Friar** (Fr. *frère*, brother). Term applied to members of the mendicant orders of the Roman Catholic Church. These have included Franciscans, 1209; Dominicans, 1215; Carmelites, 1245; Augustinians, 1256; Servites, 1233; Trinitarians,

1198; and Crutched or Crossed Friars, 1169. See Monasticism; consult also The Coming of the Friars, A. Jessopp, 1889.

**Friars Crag**. Hill overlooking Derwentwater, famous for its view. It is on the E. side of the lake, about 1 m. from Keswick. On it is a memorial to Ruskin.

**Friar Tuck**. Character in the stories associated with Robin Hood. He is described as chaplain to the outlaw. In the old time morris dance of the May games he attended upon Robin and Marian, the King and Queen of the May.

**F.R.I.B.A.** Abbrev. for Fellow of the Royal Institute of British Architects.

**Fribourg** or **Freiburg**. Canton of W. Switzerland. It is S.E. of and in parts touching Lake Neuchâtel.



Fribourg, Switzerland. The town and suspension bridge across the Saane river

Area, 644 sq. m. Chiefly in the basin of the Aar, it is watered by the Saane with its tributaries, and the Broye. Undulating in parts, it is hilly in the S.E., where it impinges on spurs of the Bernese Alps, which rise to 8,000 ft. Mainly pastoral, it is noted for its cattle and cheese. French is generally spoken; German in the N.E. section of the Canton. There are hot springs at Bonn and Montbarry. Timber and tobacco are produced, watch and paper-making are carried on, and there is a chocolate factory at Broc. A Roman Catholic stronghold, it has many convents; its cantonal constitution is not so democratic as that of the other cantons. Fribourg, the capital, is the only town of importance. Pop. 144,000.

**Fribourg**. Town of Switzerland, capital of the canton of Fribourg. It stands on the river Saane, 20 m. by rly. S.W. of Berne. A lofty suspension bridge spans the river at the confluence with the Gottenron stream. The Saane cuts the town into two parts, that on the W. side standing on level ground, and the other among rocks

and hills. The 13th century church of S. Nicholas is famed for its fine organ and its 15th century belfry. Fribourg possesses a town hall, university, college, lycée, several libraries, and a museum of fine arts. Tobacco, pasteboard, leather, and art objects are manufactured. The town was founded in the 12th century. After passing to Savoy, it joined the Confederation in 1481. It was taken by the French in 1798. Pop. 20,394.

**Fricassée** (Fr.). Dish of boiled chicken or other meat, cut up and served in a white sauce. See Cookery.

**Fricourt**. Village of France, in the dept. of Somme. It stands on the stream of that name, 5 m. E. of Albert. Captured by the British July 2, 1916, it was recaptured by the Germans, March, 1918, and retaken by the Allies in the following Aug. See Somme, Battles of the.

**Friction** (Lat., a rubbing). Resistance offered by one body to motion over another. As an example, consider a body resting on a table. It requires a certain force to move it along the surface of the table, and also to keep it moving.

The magnitude of this force depends upon two things: (1) the material of which the substances are made, and (2) the normal pressure between the touching surfaces. In 1781 C. A. Coulomb pointed out that the friction was independent of the velocity with which the surfaces moved over one another. Though his statement is now known to be inaccurate, it is, nevertheless, true for all ordinary velocities, though friction increases when bodies are moving very slowly over one another, and decreases when they are moving very rapidly. Friction between two bodies is greatly decreased by the use of lubricants.

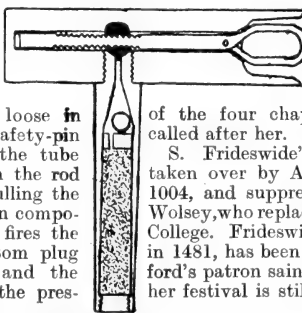
It is easier to keep a body moving on a surface than it is to start it moving, and it follows that what is known as static friction, i.e. friction at rest, is greater than kinetic friction, or friction of motion. There is a third type of friction usually recognized. When a wheel or cylinder rolls on a surface, there is resistance to motion at the point of contact, and this is called rolling friction.

Friction is of great importance in everyday affairs. Without it it

would be impossible to walk, drive a tram along ordinary rails, etc., and all movement would have to be by the use of cog wheels or some similar arrangement. The friction of fluids and gases is properly called viscosity (*q.v.*). See Force.

**Friction Tube.** Device employed for firing the charges in guns. It was adopted by the British service in 1853 to replace various adaptations of the flint lock, and mechanisms utilising percussion caps, for firing cannon. With the introduction of smokeless powders it was found necessary to provide some means of preventing the escape of propellant gases from the vent, as otherwise serious erosion occurred, and vent-sealing tubes were introduced. The fitting is T-shaped, and is clamped in the vent by the breech mechanism. The cross piece contains a roughened rod, embedded in a pellet of friction composition, provided with a looped end for the attachment of a lanyard, and secured by a safety-pin.

The stem of the tube has a magazine filled with gunpowder, above which is a diaphragm bored with three fire holes, communicating with a tapered channel which extends to the friction pellet, a soft copper ball being loose in the channel. The safety-pin is removed when the tube is fitted, and when the rod is withdrawn by pulling the lanyard, the friction composition ignites, and fires the magazine, the bottom plug being blown out and the charge fired, while the pressure wedges the copper ball against the sides of the



Friction Tube. T tube used in the British army

taper channel and the body of the magazine against the walls of the vent, so preventing any escape of gas. In the British service the friction tube has largely been superseded by electric and percussion tubes, but is still largely used by other powers for all guns except quick-firing ones which use fixed ammunition. See Ammunition; Artillery; Ordnance.

**Friday.** Sixth day of the week. The name comes from Frigg, the old northern goddess of love, and corresponds to the Latin *Dies Veneris*, day of Venus (*cf.* French *vendredi*). The day is regarded as unlucky from its connexion with Christ's crucifixion, which is specially celebrated on Good Friday (*q.v.*). In the Roman Catholic Church it is a day of abstinence, except when Christmas falls on that day.

Friday is the Mahomedan sabbath. The epithet Black is given to various disastrous Fridays, *e.g.* May 11, 1866, when the failure of the banking house of Overend, Gurney & Co. caused a financial panic. The Fridays in the ember weeks are called Golden Fridays.

**Friday.** Savage rescued by Crusoe from the cannibals about to sacrifice him, and named from the day on which he was so rescued. See Robinson Crusoe.

**Frideswide.** English abbess and patron saint of Oxford. According to tradition, she was the daughter of Didan, viceroy of Oxford under Ethelbald, and Saxfrida his wife. At an early age she made a vow of chastity, and her father built and made over to her a church at Oxford, in connexion with which she founded a nunnery, and became herself its first abbess. Persecuted by a Mercian noble named Algar, she took refuge for a time at Binsey, where she built an oratory. After her death, in the latter half of the 8th century, her shrine became a centre of devotion, as did the well at Binsey, which is said to have originated in answer to her prayers. Her remains are believed to rest in Christ Church Cathedral, one of the four chapels in which is called after her.

S. Frideswide's nunnery was taken over by Austin Canons in 1004, and suppressed in 1525 by Wolsey, who replaced it by Cardinal College. Frideswide was canonised in 1481, has been regarded as Oxford's patron saint since 1180, and her festival is still kept at Oxford on Oct. 19, though it disappeared from the English Church calendar at the Reformation. In addition to the church at Oxford, 1870-72, churches at Frilsham (Berks), Poplar, and at Borny, near Boulogne, are dedicated to her. See Christ Church; Oxford; consult also Early History of Oxford, J. Parker, 1885; The Story of S. Frideswide, F. Goldie, 1881.

**Friedland, BATTLE OF.** Victory of Napoleon over the allied Russians and Prussians, June 14, 1807. The failure of Murat's attack on the Russian entrenchments at Heilsberg, June 10, determined Napoleon to march on Königsberg. Bennigsen resolved to thwart this plan, and early on June 14 met Lannes' corps at Friedland, on the river Alle, 26 m. S.E. of Königsberg. Owing to Lannes' stubborn resistance, Bennigsen

could do no more than cross the Alle and hold him in check until the arrival of Napoleon. The Allies were now in a serious position. Behind them, in an irregular arc, lay the Alle, across which their only line of retreat lay over the bridges of Friedland.

The battle began at 6 p.m. Ney was ordered to attack Friedland, but his advance was checked by a furious charge of the Russian cavalry. Victor was hurried to his assistance, and an artillery concentration turned on the Russians, which, seconded by an irresistible dragoon charge, turned the tide of battle. A rout ensued, and the Russians, pursued by Ney, fled through Friedland and across the river. The numbers engaged were: French, 70,000, and Allies, 55,000. The Allies lost 20,000 killed and wounded, the French little over 9,000. Ten days later Napoleon met the tsar Alexander on a raft in the middle of the Niemen, and the treaty of Tilsit was concluded.

**Friedländer, LUDWIG** (1824-1909). German scholar. Born at Königsberg, Dec. 16, 1824, after studying there and at Leipzig, in 1858 he became professor of classical philology and archaeology in his native place. The work which established his reputation is *Darstellungen aus der Sittengeschichte Roms* (1862-71, 9th ed. 1919, etc.; Eng. trans. *Roman Life and Manners* under the Early Empire, 1908-13), a perfect mine of information, but written in an unattractive style. His editions of Martial, Juvenal, and Petronius *Cena Trimalchionis* are also of considerable value. He died at Strasbourg, Dec. 24, 1909.

**Friedrich, JOHANN** (1836-1917). German theologian. Born at Poxdorf, May 5, 1836, he was appointed to the chair of theology at Munich in 1865. Refusing to accept the decree of papal infallibility, 1869, he was deposed and excommunicated, 1871, and supported for a time the Old Catholic movement. In 1882 he became professor of history at Munich. He was the author of many controversial works. He died Aug. 11, 1917.

**Friedrichshafen.** Town of Württemberg, Germany. It stands on the lake of Constance, and consists of the two parts, Hofen and Buchhorn. It has a harbour on the lake, built by Frederick I, king of Württemberg, who united the two places and gave the town its present name. The chief building is the palace, at one time used by the ex-kaiser William II. It stands in wooded grounds to the W. of the town, and has an interesting chapel.





Friedrichshafen. The town, an important Zeppelin depot during the Great War, seen from the harbour entrance on the Lake of Constance

There is a Rathaus, a 20th century edifice, while the town has a meteorological station. Friedrichshafen is a tourist resort, and steamers go from here to various places on the lake, but in the 20th century, and especially during the Great War, its main interest was as a Zeppelin depot. In the workshops here the machines were put together and over the lake they made their trials, while for their reception were numerous hangars, bombed by Allied airmen in 1914-15. The building of boats is another industry. Hofen had a Benedictine monastery, and Buchhorn was a free city. Pop. 5,500.

**Friedrichshafen.** German aeroplane. It is a big two-engined biplane of the Gotha model, used for bombing purposes. Generally known as the F.F., this machine had the peculiarity of a single landing wheel under the forepart of its fuselage, a fact which rendered the type easy to recognize.

**Friedrichsrh.** Village of Holstein, Germany. It is 16 m. S.E. of Hamburg, and is interesting because the castle here was Bismarck's residence. He died here in July, 1898, and is buried in the mausoleum. Pop. 279.

**Friedrichsthal.** Town of Germany, in the Rhine prov. It is 11 m. N.E. of Saarbrück, with which it is connected by electric rly. Pop. 10,500. A village of this name in Mecklenburg-Schwerin stands near the lake of Neumühlen. There is another Friedrichsthal, this being in the Black Forest.

**Friedrich-Wilhelmshafen.** Former name of a seaport of Kaiser Wilhelm's Land, in the former German colony of New Guinea. It was occupied by an Australian force, Sept. 12, 1914, and is now administered by Australia and called Madang. White pop. 243.

**Friendly or TONGA ISLANDS.** Group of islands in the S. Pacific Ocean, a British possession. The kingdom, consisting of three groups of islands—Tongatabu,

Haabai, and Vavau—and the outlying islands of Niuatobutabu, Taofahi, and Niuafu, lies between lat. 15° and 23° 30' S. and long. 173° and 177° W. It is administered by a British high commissioner, with the assent of the king and native chiefs. The islands are

partly of volcanic and partly of coral formation, and only one-fifth of the 150 are inhabited. The people are fair Polynesians. Area, 390 sq. m. The capital is Nukualofa. The native produce consists of copra, mats, green fruit, and fungus.

The Friendly Islands were so named by Cook in 1773, on account of the courteous behaviour of the inhabitants. Tasman first touched here in 1643. There are numerous reefs and shoals around the islands, which abound in cocoapalms and a kind of fig tree with narrow, pointed leaves. There is steamer connexion with Sydney and Auckland via Fiji. British coin is the only legal tender. Salote, the queen, succeeded on April 29, 1918, on the death of her father, George II. There is a pop. of 23,121 natives and 835 other nationalities.

## FRIENDLY SOCIETIES AND THEIR WORK

John Freeman, Liverpool Victoria Legal Friendly Society

*The various types of these societies are here described. See also the article Guilds, and those on the various friendly societies, e.g. Odd-fellows, and insurance companies, e.g. Prudential*

Friendly societies are voluntary associations for the mutual relief and maintenance of members in sickness, old age, distress, etc. Roman origins have been claimed, and it is certain that in various forms they have existed for centuries. In Great Britain certain societies were founded about the end of the 17th and the beginning of the 18th centuries, but it was not until 1793 that the movement became sufficiently prominent to call for legislation. The first Friendly Societies Act was then passed, permitting an unlimited number of persons to raise funds for mutual advantage, make rules, impose fines, etc. Early societies secured the privileges of the Act by obtaining confirmation of their rules from a justice of the peace.

Various legislation followed. There were Acts in 1793, 1819, and 1829, which required an examination of the rules by a barrister, followed by those of 1834 and 1846, when the office of registrar was created. In 1896 the existing enactments were consolidated into two, affecting the main types into which the movement had developed, viz. friendly societies proper and collecting societies. The registry of friendly societies is responsible for the application of both Acts. The Friendly Societies Act, 1908, and the Assurance Companies Act, 1909, are the chief legislation of the 20th century.

Registration is voluntary. Societies may operate without regis-

tration, but the advantages of the Acts are not available to unregistered societies. A registered society can legally hold land, own property in the names of trustees, carry on legal proceedings in such names, and take summary proceedings against persons committing an offence in regard to its property. It enjoys freedom from income tax under schedules A, C, and D of the Income Tax Act, 1918. Its members may legally insure for funeral expenses on the deaths of wives and children, and may dispose of sums payable at death up to £100 by written nomination without a will.

To be registered, a society must have at least seven members, and its work is limited to its specified objects. The total amount insured on any one life may not exceed £300, whether issued by one or more than one society. Societies must make certain annual returns to the chief registrar, and must make a valuation of their assets and liabilities at least once every five years.

### Classification of Societies

Societies generally may be classified according to their purpose and the objects of their benefits. They can be established for the relief or maintenance of members during sickness or infirmity, in old age (i.e. any age after 50), widowhood, or distressed circumstances, when travelling in search of employment, or in such circumstances as shipwreck, or damage to

boats or fishing-nets, or of the dependents of members in sickness, old age, or widowhood, or, if orphan children, during minority.

Others assure money to be paid on the birth of a member's child, or the death of a member; for the funeral expenses of a member's husband, wife, or child, or of the widow of a deceased member; or, among persons of the Jewish religion, as allowance during the period of confined mourning.

Others insure against fire, up to a value of £15, the tools used by a member in his calling, or endow members or their nominees at any age, or guarantee societies or branches that their officers and servants perform their duties properly. Collecting societies may also insure money to be paid for the funeral expenses of a member's parent, grandparent, grandchild, brother, or sister.

A society with branches commonly gives sickness and maternity, medical, funeral, and in some cases unemployment benefits. Some of these benefits are for members only, some for wife or other dependents. Control is by means of delegates to an annual movable conference. It operates through local units, and organization is largely voluntary. In many instances a board of arbitrators of high standing exists to settle disputes. An example of this type of society is the Manchester Unity of Oddfellows, with over 4,000 branches in the United Kingdom, and about 14,000 in the rest of the British Empire. A centralised society gives benefits similar to the above, but it is without branches or local organizations.

Another type of society is represented by the National Deposit Friendly Society. Deposit societies combine friendly society features with savings bank features. The Friendly Societies Act provides that the rules of a society may permit the accumulation at interest, for the use of any member, of any surplus which may remain to his credit in the funds after providing for liabilities. Such societies are exempt from valuation requirements. Dividing societies which provide by rule for the periodical division of the whole or part of the funds without regard to actuarial solvency, are likewise exempted from the valuation provisions of the Act.

**COLLECTING SOCIETIES.** There are in Great Britain about 50 of these, a few very large and the rest relatively small. They are in the main occupied with industrial insurance, i.e. insurance for industrial classes at weekly or other

periodical premiums, collected by paid agents from insurers. The sums insured are usually payable on death. Each of these has a very large approved section for national health insurance. Collecting societies are a special development. They are extraordinarily popular, and of late have regarded themselves not exclusively as offices insuring funeral expenses; endowments for adults and juveniles and life policies up to £300 have grown in favour. Other types of society coming under the same official supervision and included in the statement below, are cooperative and building societies, annuity societies, cattle insurance societies, etc. The following are the figures of the different types of society:

Class of Society	Members	Funds
Orders and their Branches	2,897,434	£32,557,873
Centralised societies including deposit and dividing societies	3,893,614	28,876,538
Collecting societies	9,696,926	14,842,763
Total	16,487,974	£76,277,174
All other types including trading and building societies	10,401,466	148,105,646
Total of registered provident societies	26,889,440	£224,382,820

**POLITICAL DEVELOPMENTS.** The rapid progress of social reform in Great Britain brought important changes in friendly societies. The National Health Insurance Act, 1911, involved the cooperation of societies of all types. Originally the exclusion of collecting societies was intended, but the chancellor of the exchequer (D. Lloyd George) found it necessary to seek their assistance, fearing that in the absence of their extensive organization great difficulty would be experienced in bringing the Act into universal operation. Hence collecting and other societies were alike specially empowered to transact national health insurance, usually by means of separate sections. 44 p.c. of the total insured population of the United Kingdom is comprised in the organizations created by the collecting societies and their kindred institutions, the industrial insurance companies; while 45 p.c. are included in other types of friendly society.

A similar position was reached in the Unemployment Insurance Act, 1920. The original bill excluded societies of all types from operating this Act, the intention being that the whole insured population should resort to a labour exchange or trade union. Parliament did not support the government's intention, and modifications of the

bill led to friendly societies being empowered to form associations under the new Act. Collecting societies are specifically excluded.

Over 28,000 societies, including branches, under the Friendly Societies Act, and about 8,000 societies under other Acts, are supervised by the registry. It has limited powers, but it is able to take proceedings against defaulters, refuse improper rules, etc. Thus the registrar may appoint an inspector to investigate a society's affairs, and may call a special meeting of members; he may also, in certain circumstances, order the dissolution of a society and the distribution of its funds. Various official inquiries have been made, particularly into the section trans-

acting industrial life assurance. From 1870-74 a royal commission sat, and legislation resulted. Adequate legislation, however, to prevent the establishment of insubstantial societies, to which the chief registrar has repeatedly called attention, is even now still wanting. The last such inquiry was held in 1919, under the chairmanship of Lord Parmoor, its scope including industrial insurance companies.

The friendly society movement received its strongest impetus in the earlier part of the 19th century, while the opening years of the 20th century brought singular difficulties. Legislation appeared to threaten their existence, but they have survived. Generally their special characteristics have been scrupulously observed, alike by Parliament and the courts. For instance, legal provision has been made for the conversion of a society to a proprietary company, but the courts in interpreting this decision have made restrictions

**FRIENDLY SOCIETIES ABROAD.** In some parts of the British Empire, the friendly society movement has taken some root. In Australasia affiliated orders are active; and in Canada, also, various societies are operating. Generally speaking, the state supervision of societies is strict, and the result of this may well be the establishment of unregistered societies. In the U.S.A. they are mainly of more recent origin than in Britain, and they have been stimulated by extensive immigration, including many members of British friendly societies, and by severe economic distress. A typical illustration is the Widows and Orphans Benefit Society, originally founded when distress had been most severely felt, and the traditional horror of pauper treatment

was strongest, to provide friendly society benefits, and then converted into the Prudential Assurance Company of America, purely for insuring sums payable at death. Hence the development of other industrial insurance companies upon British lines.

In France, voluntary organizations have long existed, and those friendly societies which have been officially approved as distinct from authorised societies receive state assistance towards the payment of old-age pensions as one of their benefits. Germany presents a much more complete example of state domination, the voluntary organizations having being overshadowed, although not necessarily extinguished, by the schemes set up under different imperial statutes from 1876 onwards, for compulsory insurance upon lines which are largely followed by the British scheme of National Health Insurance, 1911. Belgium and Holland have each a considerable number of friendly societies.

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**Friendly Societies Registry.** Office created in 1846 to look after the accounts of friendly, building, and similar societies which do not come under the operation of the Acts regulating public companies. These make periodical returns to the registrar, which are tabulated in blue-books. The chief registrar is a member of the four insurance commissions and also of the joint committee. His headquarters are at Dean Stanley Street, Westminster, London, S.W., and there are branches of the registry in Edinburgh and Dublin.

**Friends of the People.** Society formed in England in 1792 by some of the more advanced Whigs to bring about parliamentary reform. Sir Philip Francis was one of its founders and helped to draw up its original programme. The members were influenced by the French Revolution, but proposed to proceed by constitutional means. The society had a short life, although its supporters included Sheridan, James Mackintosh, and Erskine.

**Friesland** (Dutch, *Vriesland*). Province of the Netherlands. The Zuider Zee and North Sea form its W. and N. boundaries, and it is contiguous on the E., S.E., and S. with

Groningen, Drente, and Overijssel; it includes the three islands of Terschelling, Ameland, and Schiermonnikoog. The flat and in parts marshy country is mainly agricultural, fertile and well watered, but unsatisfactorily managed. Considerable tracts are under sea level. Dairy farming, stock rearing, horse breeding, and peat cutting are important. At Sneek there is busy trade in cheese and butter, and at Franeker there was a university until 1811. There are several large, marshy lakes, with good fishing, notably the Fleussen, Tjeuke, Sneeker, Sloter, and Bergumer lakes. There are good communications by rly., steam tramways, and canals. The chief town is Leeuwarden (*q.v.*); other centres are Bolsward, Sneek, Dokkum, Harlingen, Franeker, Stavoren, and Hindelopen. The prov. sends four members to the lower chamber, and is marked by the prevalence of the old Frisian dialect. In parts the country is pleasant and picturesque. Area, 1,243 sq. m. Pop. 384,779.

East Friesland is the name of a district in Hanover, Germany. Lying between Groningen in the Netherlands and Oldenburg, it is also flat and marshy, and has agricultural and fishery interests. Its chief town is Aurich, others being Emden, Norden, and Leer. A canal runs from Emden eastwards to Wilhelmshafen. Area, 1,211 sq. m. Pop. 241,024. *See* Frisians.

**Frieze.** In architecture, the middle member of the entablature, between the cornice and architrave.



Frieze. Example of ancient frieze from Trajan's Forum, Rome

The Greek frieze in its simple form was divided into panels or metopes by triglyphs or channelled blocks, the metopes being sometimes sculptured with a floral design, and sometimes, as in the Parthenon, with figures. In the earliest temples the metopes and triglyphs were composed of separate blocks of stone, artificially bonded; but the Ionic and later styles aimed at making the frieze a continuous band encircling the building, with the joints concealed as much as possible.

Different varieties of frieze de-

veloped in Roman and Renaissance times, and when domestic architecture assumed importance the feature was applied both to exterior and interior decoration. The friezes in Inigo Jones's designs are sometimes divided up by attic windows. Tudor doors, windows, and walls often have classic entablatures with friezes. Exterior friezes are now mainly confined to public buildings, but modern rooms are frequently decorated with a wall-paper frieze, and occasionally with a frieze pattern in low relief. The word, Fr. *frise*, Ital. *fregio*, probably comes ultimately from Lat. *Phrygium* (*opus*), Phrygian (work). *See* Parthenon.

**Frigate** (Ital. *fregata*). Fore-runner of the modern light cruiser. A fast vessel of from 25 to



Frigate of war under full sail

50 guns, she was useful for either the attack or defence of commerce on the high seas, and for scouting duties with the line-of-battle fleets. The term was originally applied to craft in the Mediterranean using both oars and sails. The first English frigate was the *Constant*

Warwick, designed by Peter Pett for the earl of Warwick for use as a privateer, built at Ratcliff, on the Thames, in 1646, and purchased into the navy in 1649. The designation was retained in the British fleet for many years after the introduction of steam, and it was not until 1883 that it was replaced by cruiser. In sailing days any warship other than a stationary vessel, storeship, or troopship was classed as a cruiser; but this term is never applied now to any vessel built to lie "in the line." *See* Cruiser.

**Frigate Bird** (*Fregata aquila*). Sea-fowl related to the gannet and the pelican. It has a long, slender



**Frigate Bird.** Specimen of the larger species found in tropical regions

body, ending in a forked tail resembling that of the swallow, and the beak is long and hooked. Found only in the warmer seas, usually far from land, it lives upon the fish that it catches or robs from other sea-fowl.

**Frightfulness.** Anything leading to fright or terror. The word came to have a special meaning during the Great War as translating the German *Schrecklichkeit*. The German theory of war taught that the ends could be most quickly secured by deliberate terrorism, and this policy of frightfulness inspired many of their actions in Belgium and France. See Atrocities.

**Friiled Lizard** (*Chlamydosaurus*). Australian lizard. Measuring nearly a yard in length, it is distinguished by a large membranous frill on either side of the neck. This is usually folded back, but can be erected when the animal is alarmed, apparently for the purpose of frightening its enemies. It is a harmless creature, found only in sandy districts.

**Frilling** (old Fr. *friller*, to tremble). Pleated edging for dresses or undergarments. In the 18th century, to frill meant to shiver, and frilling was at first an edging of lace or some material so light that it shook with movement. Later it meant a narrow edging of lace pleated into a band and sewn into the neck and sleeves of dresses.

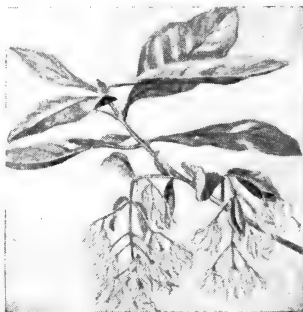
**Frimaire** (Fr., the month of frost). Third month in the year as rearranged during the French Revolution. It began on Nov. 21 or 22. See Calendar.

**Frimley.** Urban dist. and village of Surrey, England. It stands on the Blackwater, 2 m. S. of Camberley, on the L. & S.W.R. In the Aldershot area, it is mainly a residential district. A farm colony of 15 acres for sailors and soldiers suffering from tuberculosis was organized here in 1920. Pop. 13,673.

**Fringe.** Strictly, loose threads forming an ornamental border to anything, e.g. the fringe of a garment. The word is also used for hair cut straight across the fore-

head. It is used by analogy for anything on the border, e.g. the fringe of empire. See Frilling.

**Fringe Tree** (*Chionanthus*). Genus of shrubs or small trees of the natural order Oleaceae. Natives



**Fringe Tree.** Foliage and drooping flower of the Chinese shrub

of China and N. America, they have large, smooth, magnolia-like leaves, and white, sweet-scented flowers which hang in graceful clusters; the corolla is cut into narrow segments, which give it a fringed appearance. *C. virginica*, the American species, is also known as snowdrop-tree.

**Frinton-on-Sea.** Urban dist. and seaside resort of Essex, England. It is 2 m. S. of Walton-on-the-



**Friiled Lizard.** *Chlamydosaurus Kingi* from Australia

Naze, on the G.E.R., and has good bathing facilities and golf links. A model garden town, its avenues are wide and are planted with trees. Sea walls and promenades have been constructed, and a pleasure ground of 50 acres. Pop. 1,510.

**Fripp**, SIR ALFRED DOWNING (b. 1865). British surgeon. Born Sept. 12, 1865, he was educated at Merchant Taylors' School, and took his degrees in medicine at London University. He served in the South African War, where he was chief civilian medical officer at the Imperial Yeo-

manry hospital. Surgeon to Guy's and other London hospitals, he was also surgeon to the king. In 1903 he was knighted.

**Frishes Haff.** Lagoon off the N. coast of Prussia. It is separated from the Gulf of Danzig by a strip of land 40 m. long and about one mile wide, called the Frische Nehrung. The lagoon or haff is about 50 m. long and of varying breadth; it covers 330 sq. m. The opening to the outer sea is at the N.E. end, where a channel has been dredged for traffic. Before 1510 the lagoon was entirely landlocked, but in that year a storm destroyed a little of the sand barrier. The Elbing, Passarge, Pregel, and Nagot flow into the Haff, while the port of Elbing is 5 m. from it.

**Frise.** Village of France, in the dept. of Somme, 9 m. W. of Péronne. Heavy fighting took place between the French and the Germans here, Jan.-Feb., 1916. It was captured by the former under Foch, July 2, 1916, retaken by the Germans in March, 1918, and finally recovered by the Allies the following Aug. See Somme, Battles of the.

**Frisian Islands.** Chain of islands extending from the coast of Slesvig-Holstein, Denmark, to the southern mouth of the Zuider Zee in Holland. They are the remains of a former coast-border of Jutland and Holland, and their sandy character and lack of vegetation attest the process of erosion they must have undergone in the course of centuries; local legends tell of old villages now submerged. Most are popular German sea-bathing resorts.

The chain may be divided into three groups, North Frisian, East Frisian, and Dutch. The North Frisian Islands lie off the W. coast of Slesvig-Holstein, from which they are separated by the Watten, an arm of the sea. Interspersed among them are the Halligen, low sandbanks covered with marine grass.

The principal member of the group and the largest German island in the North Sea is Sylt, which has an area of 39 sq. m. and a population of 4,800. Its capital is Westerland (pop. 2,400), situated on its W. side, consisting of two portions, Alt-Westerland, and the more modern Neu-Westerland, separated from the sea by a chain of sand-dunes and a stone embankment. Next in importance is the island of Föhr, on the E. coast of which lies the village of Wyk (pop. 1,800), which possesses an interesting museum of Frisian antiquities and handsome public gardens. Amrum, 6 m. long by



**Sir Alfred D. Fripp,**  
British surgeon  
Russell

3 m. broad, lies S. of Sylt and has 1,000 inhabitants.

The East Frisian Islands form an almost continuous line masking the German coast between the mouths of the Ems and the Weser. Norderny (pop. 3,400) is 8 m. long by  $1\frac{1}{2}$  m. broad. Its mild climate and magnificent stretch of sandy beach make it a favourite summer resort. Borkum (pop. 3,300), situated at the mouth of the Ems, 9 m. N. of the Dutch coast, is 5 m. long by  $2\frac{1}{2}$  m. broad, and is perhaps the most popular holiday resort, and its breed of milch-cattle is much esteemed. Wangeroo, 5 m. long by 1 m. broad, formerly belonged to Oldenburg. About 2 m. W. of the present village are the ruins of an older inhabited site overwhelmed by a violent storm. Spiekeroog, regarded as part of Prussia, is 5 m. long by  $1\frac{1}{2}$  m. broad and attracts

connected with the other Low German peoples along the coast, notably the Angles and Saxons, and the old Frisian dialect survives in the Dutch and German Friesland and in parts of W. Slesvig, especially in the coastal country near Tondern.

The Frisians were partially conquered by the Roman general Drusus, c. 12 B.C., but their early history is obscure. Numbers of them were probably associated with the Angles and Saxons in their incursions into Britain during the 4th and 5th centuries. Friesland generally was made tributary to the Frankish empire of Pepin II in 689, and after a revolt was reconquered by Charles Martel in 736. It fell to Charlemagne in 784. It retained a fair degree of independence during the Middle Ages. For a short time in Saxon posses-

more particularly barley, of northern Europe. It is not found in Britain, though there its allied species, *C. taeniopus*, frequently attacks barley.

**Frith, JOHN** (1503-33). English martyr. The son of a Kentish innkeeper, he was educated at King's College, Cambridge, afterwards becoming a member of Christ Church, Oxford. He helped Tyndal to translate the Bible, and his abilities and scholarship soon made him prominent among the advocates of the reformed faith. This led to his enforced departure from England, and for about six years he lived in Germany and Holland. Having returned to England, he was arrested. In prison and on examination, he defended by pen and word his beliefs; consequently he was burned to death at Smithfield, July 4, 1533.



William Powell Frith. *Ramgate Sands*, an example of one of the artist's larger compositions, exhibited at the Royal Academy in 1854 and purchased by Queen Victoria

comparatively few summer visitors. Langeoog is  $8\frac{1}{2}$  m. long by 1 m. broad, and has five thousand inhabitants.

The Dutch Frisian group, of which the most important islands are Terschelling, Vlieland, and Texel, screens the mouths of the Zuider Zee. The inhabitants are chiefly concerned with agriculture and dairy-farming, and though honest and good-natured, are backward. Frisian, the original speech of these islands, bears a remarkable resemblance to the older forms of English.

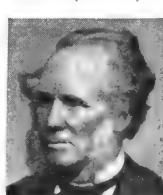
**Frisians.** People of Teutonic race originally inhabiting the country now covered by the Dutch provinces of Friesland and Groningen and the German district of East Friesland. They were closely

sion, Friesland was ceded to the emperor Charles V in 1523, but joined the United Provinces in 1579, remaining one of these until 1795, when it was merged into the Dutch territories.

East Friesland became distinct from the rest of the Frisian lands in 1430, when it became a fief of the powerful Cirkensa family, by whom it was ruled until 1744, when it was incorporated in Prussia. Transferred to Holland in 1808, and in French possession 1810-13, it was recovered by Prussia and ceded by her to Hanover in 1815.

**Frit.** Name popularly applied to certain small dipterous insects destructive to corn crops. The one generally so named is *Chlorops frit*, a small black fly which sometimes causes havoc among the crops,

**Frith, WILLIAM POWELL** (1819-1909). British painter. Born at Aldfield, Yorks, Jan. 9, 1819, son of



an innkeeper, he studied at Sass's Academy, Bloomsbury, and at the R.A. schools. Founding his style on that of Daniel Maclise, he began to paint historical subjects, his Malvolio being

hung at the R.A., 1840. He was elected A.R.A. in 1844, and R.A. in 1852. He scored popular successes with *Ramgate Sands*, 1854;



Derby Day, 1858; The Railway Station, 1862; Private View at the R.A., 1881. Dickens was among Frith's early friends. He died in London, Nov. 2, 1909. See Ashton, Lucy; Dickens, illus.

**Fritillaria.** In zoology, the name applied generically to certain Ascidians, commonly called sea squirts, of the free swimming class. In botany it is given to a large genus of Liliaceae. (See Snakeshead.) Fritillary is the name given to several species of butterfly of the *Argynnis* and allied genera. Several of these are native in Great Britain. See Butterfly, colour plate.

**Früli.** District of Italy, at one time an independent duchy. It lies around the head of the Adriatic and was, before 1918, partly in Austria and partly in Italy. It is about 3,300 sq. m. in area, and has a pop. of about 700,000. The Isonzo and the Tagliamento flow through it, and there was much fighting here during the Great War. The adjective for Früli is Furlanian.

The district takes its name from the Roman settlement of Forum Julii, the later Cividale (*q.v.*). The Lombards ruled it for some centuries, after which it passed from one ruler to another. Venice secured part of it, while eastern Früli was added about 1500 to the lands of the house of Austria. In 1797 Austria obtained the Venetian portion, which she retained in 1815. In 1866 the new kingdom of Italy was given the part that had previously belonged to Venice, and so matters remained until the Great War. After then Austrian Früli was claimed by both Italy and Yugo-Slavia, but by the treaty of Rapallo (1920) the whole became Italian. The capital of the district is Udine (*q.v.*).

**Frobenor** **FROBENIUS, JOHANNES** (c. 1460–1527). German scholar-printer. Born at Hammelburg, Franconia, and educated at Basel University, he opened at Basel, 1491, a printing office, where he printed many of the works of Erasmus, a close friend, a Latin Bible, a Greek Testament, edited by Erasmus and illustrated by Holbein, and editions of the Latin Fathers.

**Frobisher, Sir Martin** (c. 1535–94). English sailor. Born in Yorkshire, he made a voyage to Guinea in 1564, and spent some years in voyages to the Levant and N. Africa. In 1575 he was commissioned by the Muscovy Company to search for the North-West Passage, and set out on June 7, 1576, with two ships of 25 and 20 tons respectively, sighted Greenland, where he lost the smaller vessel, and reached Frobisher Bay in N. America.



Sir Martin Frobisher,  
English sailor

From a print

Returned gold. In 1579 he made a third voyage, and discovered a new strait, but did not make any survey. In 1586 he was vice-admiral to Drake's expedition to the W. Indies, and, in command of the *Triumph*, helped to defeat the *Armada* (1588). He was knighted for his gallantry. He was vice-admiral to Sir John Hawkins in 1590, being sent by Raleigh to harry the Spanish coast in 1591. Mortally wounded in the sea attack against Brest, then held by the Spaniards, he died at Plymouth, Nov. 22, 1594.

**Frobisher Bay.** Inlet off the coast of British N. America. Long and comparatively narrow, it cuts into the eastern end of Baffin Land from the Atlantic. Its length is about 250 m., and its breadth about 20. It is about 200 m. S. of the Arctic circle.

**Frock** (late Lat. *frocus*). Word used as both noun and verb. In the former sense it is applied to a monastic robe, with loose sleeves, reaching to the feet; to a dress worn by women and girls; to a rough worsted garment (strictly, Guernsey frock) worn by sailors over or in place of a shirt; and to a double-breasted, skirted coat worn by men and properly called a frock coat. As a verb the word to frock means, figuratively, to make a man a monk or priest. To unfrock means to deprive monk or ecclesiastic of his privileges as such. See Costume; Gown; Smock.

**Fröding, Gustaf** (1860–1911). Swedish poet. Born in Vaermaland, Aug. 22, 1860, and educated at Karlstad and Upsala, he afterwards joined the staff of the Karlstad paper, and wrote occasional verse. Spending some time in Germany, he studied English and German lyrical poetry, from which he made various translations. His first book, *Guitar and Concertina*, 1891, was an immediate success. New Poems, 1894, and other books were issued, 1894–98, and in 1901–2 his collected works were published. Much of his verse was written in dialect.

Fröding's original humour and spontaneity, vivid portrayal of Swedish life, lyrical perfection,

and pithy language, which has already influenced the Swedish tongue, have placed him first among modern Swedish poets. His last years were spent mostly in hospital, but in 1910 he published a volume of poems, *Second Harvest*. A selection of Fröding's poems was translated by C. N. Stork, 1916.

**Frodsham.** Parish and market town of Cheshire, England. It is 10 m. N.E. of Chester, and has a station on the Chester-Manchester rly. It has a Norman church, dedicated to S. Lawrence, and restored in the 19th century, a town hall, and, formerly, a castle. The chief industries are the manufacture of chemicals, salt, and cotton. Frodsham Marshes is a low-lying area between the Weaver and the Mersey, which rivers meet near here. Pop. 3,000.

**Froebel, Friedrich Wilhelm August** (1782–1852). German educational reformer. Born at Oberweissbach, April 21, 1782, he spent his youth in the heart of the Thuringian Forest, where his long observation of nature gave



*Friedrich Froebel*

him many of the ideas which later marked his teachings. He studied at Jena, 1801, and at Göttingen, 1811, teaching in the interval. In 1813 he served in the War of Liberation in Lützow's corps. In 1816 he opened a small school at Griesheim, Thuringia, transferred later to Keilhau.

His book, *The Education of Man*, appeared in 1826, and he did important work in training teachers at Burgdorf, Switzerland, between 1833–37. He opened his first kindergarten (children's garden) in Blankenburg, near Keilhau, in 1837, by which date his principles were making headway. Lecturing, writing, and teaching, Froebel spent his remaining years busily, and died June 21, 1852. See Froebel System.

**Froebel Society.** Society founded to assist in the dissemination of the Froebel system of child education. It organizes lectures for teachers, students, and all persons interested in early education, maintains a library, and publishes periodical proceedings. Its headquarters are at 4, Bloomsbury Square, London, W.C. The society is represented on the examination board of the National

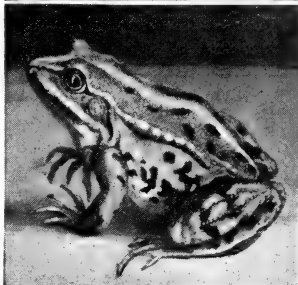
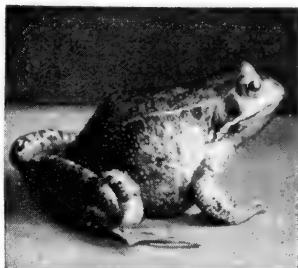
Froebel Union, which issues certificates to teachers of children under 14. To obtain these certificates, which are recognized by the board of education, about two years' training is required, colleges for which are found in most large educational centres in the United Kingdom.

**Froebel System.** Name given to the theory or plan of children's education enunciated by Friedrich Froebel (*q.v.*). Convinced of the essential unity of all things human, natural, and divine, Froebel held up as the ideal of education the leading of man to a full consciousness of this unity and the teaching of the ways to attaining it. Like Heinrich Pestalozzi (*q.v.*), he believed that children should be allowed to develop naturally, in happy and harmonious surroundings, and with trained guides and helpers to safeguard the natural process. His system lays great stress on the value of play, which is regarded as a spiritual activity, and on the educational value of giving a free hand to the instinctive sense of rhythm and the natural creativeness of the child mind.

The main part of Froebel's theories was put into practice in the kindergarten schools, but the underlying doctrines are meant for all stages of education. In the kindergartens the child's senses are developed by such means as clay-modelling, paper-folding, work with colour brushes, mat-plaiting, bead-threading, etc., and the observation and care of natural objects, animals, flowers, etc., help to encourage his finer instincts. See Education; Kindergarten; Montessori Method.

**Frog.** Smooth-skinned member of the order Ecaudata (tailless), of the class Batrachia. This order includes all the frogs and toads, numbering more than 1,000 species, which are distinguished from newts and salamanders by the absence of a tail in the adult stage. The name frog is restricted to the family Ranidae, of which nearly 200 species are known. The bony structure of all the frogs is peculiar in having the hinder half of the vertebral column modified into a simple jointless bone; while the two bones usually found in the fore arm and lower leg of vertebrates are fused together. They possess tongues whose base is in the front of the mouth; and have teeth in the upper jaw and palate only. The fore feet are not webbed; the hind ones partially webbed.

Frogs are found in all parts of the world, except in New Zealand, Papua, the extreme S. of South America, and the frozen regions. As



Frog. Bottom, the edible variety, *Rana esculenta*. Top, common frog, *R. temporaria*

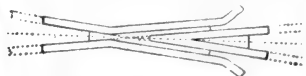
they can only live in damp places, they are absent from deserts and the higher ranges of the mountains.

Like all batrachians, frogs pass through a series of metamorphoses. The eggs are deposited in a jelly-like mass in fresh water, and hatch out as tadpoles, consisting of an oval body and a long tail. During this stage they breathe by means of gills. The tail and gills are gradually absorbed, and at the same time the four limbs make their appearance. At the completion of this stage they leave the water and take to a terrestrial life, breathing air by means of lungs. The air is taken in by a kind of swallowing action, and if the mouth is kept open for any length of time the animal will die by suffocation, as it cannot inhale apart from the action of the mouth, owing to the absence of ribs. The food consists of insects and slugs, which are seized by thrusting out the long, sticky tongue. Frogs are therefore valuable to the gardener and should never be destroyed. The winter months are passed in a state of hibernation, usually in the mud of ponds, but occasionally in holes and crevices.

Great Britain possesses two species of frogs, of which the common frog (*Rana temporaria*) is found almost everywhere. The edible frog (*R. esculenta*) is found mainly in the eastern counties, and is distinguished from the commoner species by its usually larger size and more mottled appearance, especi-

ally on the thighs. There is a distinct fold along each side of the body, and the males have a conspicuous round sac on either side of the head, which is distended when croaking. On the Continent and in N. America the edible frog is often used for the table, the flesh of the thighs resembling that of a very young chicken; but it is rarely eaten in Great Britain. See Animal; Embryology, *illus.*

**Frog.** In engineering, two short lengths of rail spliced together and forming part of a railway crossing.



Frog used in engineering as part of a railway crossing

A wrecking frog is a device with one end raised to form an inclined plane by which derailed rolling stock can be replaced on the track. The frog is laid alongside the rail with the lower end towards a wheel of the derailed vehicle; by pulling the latter the wheel mounts the frog, which guides it on to the rail. It is also known as a railway ramp. (See Railways.) The term is also applied to part of a horse's hoof, and to that part of a soldier's equipment which carries the sword or bayonet.

**Frogbit** (*Hydrocharis morsus-ranae*). Floating aquatic herb, of the natural order Hydrocharitaceae. A native of Europe and N. Asia, it has long-stalked, kidney-shaped leaves, reddish beneath; and three-petalled white flowers. It sends out runners which produce new plants, and in autumn bulbs which sink to the bottom of the ponds and ditches in which it lives, where they pass the winter in the mud. In spring they rise to the surface, and put out leaves. The male flowers are in clusters of two or three; the females solitary.



Frogbit. Bulbs rising to the surface. One has developed into a plant with four leaves

**Frog Hopper.** Name popularly given to a large family (*Cercopidae*) of hemipterous insects. Their larvae may be noticed on plants, where they are covered with froth and are often known as "cuckoo spit." The adult insects



Frog Hopper of the Alder, *Aphrophora alni*. Above, spiny-legged frog-hopper, *Evacanthus interruptus*

are grey or greeny, and leap vigorously if disturbed.

**Frogmore.** Royal residence of Berkshire, England. It is within the Home Park, Windsor, 1 m. S.E.



Frogmore, Windsor. Royal Mausoleum built by Queen Victoria, 1862-70  
F. W. Hardie

of the castle; and was purchased by Queen Charlotte in 1800. The duchess of Kent died here in 1861. Since then it has been used by other members of the royal family. A cruciform structure surmounted by an octagonal lantern was erected by Queen Victoria over the tomb of the Prince Consort. The remains of the queen were buried here in 1901.

**Frogmouth.** Family of night-flying, insectivorous birds. Resembling the nightjar, they are notable for their very wide mouths. There are numerous species, distributed over Australia, Malaya, and the eastern districts of India.

**Frogs, THE.** Comedy by Aristophanes, produced 405 B.C. The god Dionysos goes down to Hades to fetch up Euripides from the dead.

A contest for supremacy takes place between the rival tragedians Aeschylus and Euripides, in which each humorously criticises the specimens of style given by his opponent. The palm is awarded to Aeschylus, who returns to earth with Dionysos to offer the benefit of his advice to the Athenians. The play takes its name from the chorus of frogs who accompany the god in his passage over the lake of the underworld.

**Frohman, CHARLES** (1860-1915). American theatrical manager. Born at Sandusky, Ohio, June 12, 1860, he was first employed in The Daily Graphic offices, New York, and then as box-office clerk at Hooley's Theatre, Brooklyn. In 1893 he



Charles Frohman, American theatrical manager

established himself at the Empire Theatre, New York, and later had five other theatres under his control in that city. In 1897 he became lessee of the Duke of York's, London, where he brought out Sir James Barrie's plays, *The Admirable Crichton*, 1903; *Peter Pan*, 1904; *What Every Woman Knows*, 1908; and experimented with a repertory system in 1910, producing plays by Barrie, Bernard Shaw, John Galsworthy, and Granville Barker. He was drowned in the *Lusitania*, May 7, 1915. See Charles Frohman: Manager and Man, I. F. Marcossion and D. Frohman, 1916.

**Froissart, JEAN** (c.1338-c.1404). French chronicler. The son of an heraldic painter, Froissart was born at Valenciennes, and probably started to write the first part of his history about 1358. He became secretary to Philippa of Hainault, queen of Edward III of England, in 1361, and while in her service visited the court of David II of Scotland. For a short time he returned to his native Flanders, but in 1366 followed Edward the Black Prince to Gascony, and paid visits to several courts of N. Italy. Philippa died in 1369, and he found other patrons in Count Robert of Namur, Duke Wenceslas of Brabant, and Guy de Blois, the overlord of Chimay. From the last he obtained the benefice of Lestines.

au-Mont. In 1388 Froissart visited Béarn, and travelled with the knight Espaing de Lyon, whose stories gave him much picturesque matter for his *Chronicles*, to the brilliant court of Gaston Phoebus of Foix at Orthez. In 1395 he paid another visit to England, and died at Chimay.



Jean Froissart, French chronicler

The *Chronicles*, in four books, trace the history of the main events in England, Scotland, Ireland, France, Flanders, and Spain, as well as happenings at the papal courts at Rome and Avignon, between 1325 and 1400, and form one of the greatest of medieval historical works. The first book, much of its material borrowed from the earlier chronicler Jean le Bel, views the course of events largely from the English point of view, written as it was under English patronage. But on the whole Froissart gives a fair version of events as he saw them, or as the witnesses available described them to him. He spared no effort in the search for reliable testimony.

Modern research has corrected errors of chronology, statistics, and topography, but Froissart shows a great advance on most of his predecessors. He definitely presents his picture as a whole, relating cause and event in due sequence, not content merely to enumerate bald facts. But his work is chiefly prized for its vivacious narrative of the best side of the chivalric age. Froissart, who also wrote some inferior verse, was the friend of several notable poets, especially Eustache Deschamps, and probably Chaucer. The first dated edition of the *Chronicles* appeared in 1504; the first Eng. trans. by Lord Berners, 1525.

**FROME** OR **FROME SELWOOD.** Urban dist. and market town of Somerset, England. It stands on



Frome, Somerset. The market place and cross

the Frome, 24 m. by rly. S.E. of Bristol on the G.W.R. Brewing, printing, and the manufacture of cloth are the chief occupations, the woollen industry having greatly declined. The parish church, a Decorated building dating from the 14th century, was restored on a magnificent scale in the 19th. There are also a museum, market hall, and grammar school. Market days, Wed. and Sat. Pop. 10,901. *Pron.* Froom.

**Frome.** Lake of S. Australia. It lies in the Eastern Plains, 50 m. E. of the Flinders Range. About 50 m. long from N. to S., it is 25 m. wide from E. to W. The Wilpena river issues from its S. extremity.

**Fromelles.** Village of France, in the dept. of Nord. It is 6 m. N.E. of Festubert, and came into prominence during the Great War, especially in the Allied offensive of the spring of 1915. The British attacked the Germans here on May 9. See Aubers Ridge, Attack on the; Festubert, Battle of.

**Fromentin,** EUGÈNE (1820-76). French painter and writer. Born near La Rochelle, he studied under Cabat and painted Algerian life and landscape. He is better known, however, as the writer of *A Summer in the Sahara*, *A Year in the Sahel*, both models of the art of word-painting, and of *The Masters of Past Time in the Low Countries*, a book of descriptive art-criticism. He died Aug. 27, 1876.

**Fronde,** THE. Name given to the insurrection and civil war in France under the regency of Anne of Austria and Cardinal Mazarin, 1648-53. Its two phases are known respectively as the parliamentary Fronde and the Fronde of the princes. The name comes from that of a small sling used during the disorders in Paris.

In 1648 Mazarin sought the sanction of the parliament of Paris to fresh and burdensome taxes by offering that body certain fiscal exemptions. This the parliament refused, and drew up forthwith a series of 27 articles of constitutional reform, forbidding the imposition of unauthorised taxes, reducing certain imposts, etc. After momentarily yielding, the queen-regent suddenly arrested the parliamentary leaders, Broussel, Blancmesnil and Charton. The Parisians raised street barricades and the court party was alarmed into releasing the prisoners and granting the required reforms. Mazarin, however, strengthened by the adherence of Condé, obliged the parliament to sign the peace of Rueil, March 11, 1649, with which the first phase closed.

Jealous of Mazarin's power, however, Condé turned against him,

but was arrested and imprisoned with other malcontent nobles, Conti and Longueville. Another foe of the cardinal, Paul de Gondî, a powerful ecclesiastic, stirred up revolt in Paris, forcing the minister to release Condé and to quit France early in 1651. He returned in Jan., 1652, whereupon Condé, with Spanish aid, headed a powerful movement against the court party. Raising an army in the south, he defeated the royal forces at Bléneau, and, despite Turenne's able defence at the Faubourg S. Antoine, occupied Paris. His unpopularity forced him to leave in July, when the court and the cardinal returned. By the summer of 1653 the Fronde, in spite of a determined struggle in Guyenne, was crushed, and this singularly unnecessary civil war had ended in the powers of the parliament of Paris being severely curtailed and the monarchical power correspondingly consolidated. See France: History; Mazarin.

**Front.** Military term. In drill it has been differently applied at various periods, but at present it indicates the direction in which the troops face when in line, irrespective of whether the original front rank is in front or in rear. In war, the term front is employed to indicate that part of the war area in which the troops are in actual fighting contact and so far behind as is occupied by the immediate administrative services of the fighting troops and the reserves.

In modern warfare, the depth of the front has greatly increased owing to the much higher power and longer range of present-day artillery, the heavy guns often being situated several miles in rear of the infantry units which are in contact with the enemy's troops. Consequently auxiliary services which previously were entirely employed on the lines of communication are now required to operate actually "at the front." To facilitate organization a definite sector of the front is allocated to each unit. See Flank; Tactics.

**Frontal Bone.** In human beings the bone which forms the forehead, the upper margins of the orbits, and the forepart of the skull. See Anatomy; Man.

**Frontenac, LOUIS DE BUADÉ, COMTE DE** (1620-98). French governor of Canada. He belonged to a noble family of Béarn, and served in the French army with distinction. In 1672 he was sent out to New France as governor, and held that position until 1682, and again from 1689-98. As a ruler he was successful, but his autocratic temper caused constant quarrels



Louis de Frontenac, from the statue by P. Hébert, Provincial Parliament Buildings, Quebec

with other high officials, especially Laval-Montmorency, bishop of Quebec. Frontenac died at Quebec, Nov. 28, 1698.

**Frontinus, SEXTUS JULIUS** (c. A.D. 40-105). Roman soldier. While governor of Britain from 75-78 he gained a great victory over the Silures of S. Wales. He was the author of *Strategemata*, a collection of anecdotes of famous military leaders, and of *The Aqueeducts of Rome*, an account of their construction, arrangement, and maintenance, written after his appointment as *curator aquarum* or superintendent of the water-supply in 97.

**Fronto, MARCUS CORNELIUS.** Roman rhetorician. Born at Cirta in Africa, he flourished in the reigns of Hadrian and Marcus Aurelius, with the latter of whom he was on very friendly terms. As an advocate and teacher of rhetoric he amassed a large fortune, and was raised to the consulship A.D. 143.

A number of Fronto's letters, including correspondence with Marcus Aurelius, discovered by Cardinal Mai at the beginning of the 19th century, do not justify his great reputation among his fellow-countrymen, although they exhibit him as a man of honourable and upright character.

His importance in the history of Latin literature lies in the fact that he was the father of what was called the *elocutio novella*, "partly a return upon the style of the older (pre-Ciceronian) Latin authors, partly a new growth based, as theirs had been, on the actual language of common life" (Mackail). This *elocutio novella* was destined to be the parent of the Romance languages. Fronto died about 170.

**Front Range.** Name given to a section of the Rocky Mts. It is the most eastern part of the range, hence its name. In the state of Colorado, its chief peaks are Pike's Peak and Long's Peak; both are over 14,000 ft. high. See Rocky Mts.

**Frosinone.** Town of Italy, in the prov. of Rome; the ancient Frusino. Built on a hill overlooking the Cosa, an affluent of the Sacco, 54 m. by rly. S.E. of Rome, the town has many churches, holds an annual fair, and is noted for its wine. In former times its outskirts were infested by brigands. Near are remains of the Volscian city of Frusino, conquered by the Romans in 304 B.C. Pop. 11,646.

**Frost.** Term used for the formation of ice on ground, plants, etc., sometimes called hoar frost or rime. The formation of hoar frost is due to the condensation of water vapour on surfaces which are themselves at a temperature of less than 32° F. The frost consists of small particles of ice, crystalline in structure, which often form the most variegated patterns. Hoar frost is in reality frozen dew. Frost coming in late spring and early autumn is often most injurious to crops, and many methods of frost protection are in use. A screen or light covering of any material helps to prevent hoar frost on plants by lessening the radiation of the plants' natural heat; fires, with plenty of warm smoke, are effective, especially in still air, when the smoke spreads evenly; and the ground itself may be warmed by fires or flowing water.

Black frosts are long-continued severe frosts, generally with absence of hoar or white frost, and are so called because they kill or blacken vegetation. Among the great frosts of recent years in Great Britain are those of 1890-91, lasting for eight weeks, most severe in England; of Jan. and Feb., 1895, the coldest Feb. known in Great Britain, when ice 25 ins. in thickness was measured on many waters; and that of Feb., 1902. See Ice; Meteorology.

**Frost, JOHN** (d. 1877). English Chartist. Son of a Monmouthshire publican, and a tailor and draper by trade, he was appointed mayor of Newport in 1836, represented Monmouthshire at the Chartist convention of 1839, and was removed from the commission of the peace for seditious speeches. Hailed as a popular champion, on Nov. 4, 1839, he led an armed mob into Newport. The rising was easily suppressed, and Frost was sentenced to be hanged, drawn, and quartered, but the sentence was commuted to transportation for life

to Van Diemen's Land. In 1856 he received a free pardon and returned to England. He died at Stapleton, near Bristol, July 29, 1877.

**Frost-bite.** Localised gangrene of the tissues produced by exposure to severe cold. The parts of the body most likely to be involved are the fingers and toes, owing to the more sluggish circulation of the blood in the extremities, and exposed parts such as the nose and ears. The first sign of frost-bite is a patch of redness with slight swelling and sometimes severe pain. If the exposure continues the part becomes white, hard, shrunken, and waxy-looking, but without pain, so that the individual may be quite unaware of what is taking place. Ultimately the affected part becomes black and ulcerated.

Treatment consists in very gradual restoration of circulation in the affected area. The patient should be kept in a cold room, the temperature of which is slowly raised, and the frozen part rubbed with snow or bathed with cold water. If actual gangrene occurs the part must be kept carefully protected and aseptic until a line of separation forms, and the subsequent ulceration heals.

**Frostburg.** Town of Maryland, U.S.A., in Allegheny co. A favourite summer resort, it occupies an elevated position about 2,150 ft. above sea level, and is 12 m. W. of Cumberland, on the Cumberland and Pennsylvania and the West Maryland rlys. It contains a state normal school, and among its industries are founding and the manufacture of hosiery, bricks, and tiles, but coal-mining is the leading occupation. Settled in 1812, it became a municipality in 1870. Pop. 6,028.

**Frost Figure.** Ice crystal formations which appear under certain conditions of cold weather. Figures, resembling ferns and often over two feet in length, are frequently formed by frost following rain. See Snow Crystals.

**Froude, JAMES ANTHONY** (1818-94). British historian. Son of the Rev. Robert Hurrell Froude, he



James A. Froude,  
British historian

was born at Dartington, Devon, April 23, 1818. Educated at Westminster School, in 1835 he entered Oriel College, Oxford, afterwards becoming a fellow of Exeter. At Oxford Froude was associated with the Tractarians, but he never joined them, although

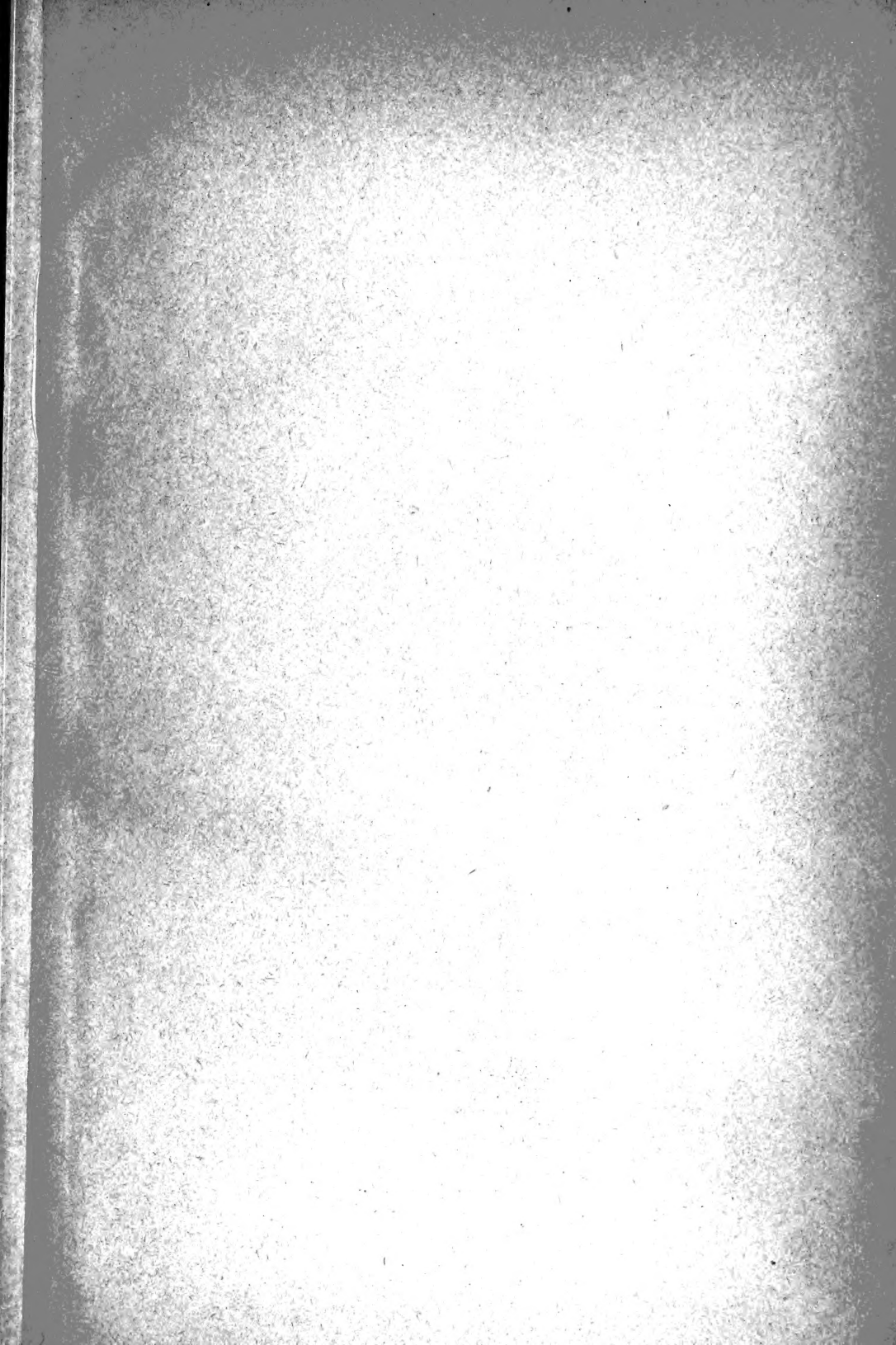
he took Holy Orders in 1844. Influenced by Carlyle's books, he broke with orthodox religion. He expressed his changed views in *The Nemesis of Faith*, 1848, gave up his fellowship, and, as soon as the law permitted, became a layman once more.

In 1849 Froude married. He made the acquaintance of Charles Kingsley, and, more important, of Carlyle, and set to work upon his *History of England from the Fall of Wolsey to the Spanish Armada, 1556-70*. It was completed in twelve volumes and is the monument to Froude's life. No historical work was ever more deservedly or more sharply criticised, and yet its merits are as conspicuous as its faults. The style is powerful, graceful, and restrained, for Froude, like Burke, is "one of the great masters of the high and difficult art of elaborate composition." But against this are blemishes of partiality and worse, for critics have asserted that, in pursuance of his aim, the author did not hesitate to misquote his authorities. As pendants to this work Froude wrote *The Divorce of Catherine of Aragon, 1891*; *The Spanish Story of the Armada, 1892*; and *Lectures on the Council of Trent, 1896*.

In other directions Froude's writings led to acrimonious criticism. His book, *The English in Ireland in the 18th century, 1871-74*, was resented by the Irish and their friends. As the sequel to an intimate friendship, Froude was named as Carlyle's executor, and he published some *Reminiscences, 1881*, *Mrs. Carlyle's Letters, 1882*, and *Life, 1882-84*, which gave a markedly unfavourable picture of the relations between Carlyle and his wife. For this Froude was attacked on the ground of misrepresentations, and he replied with two books: *Carlyle's Life in London*; and *My Relations with Carlyle*. Another controversy arose out of Froude's book, *Oceana, or England and her Colonies, 1886*.

Froude took an interest in politics, and was twice sent on missions to S. Africa by Lord Beaconsfield's government. In 1892 he succeeded Edward A. Freeman as professor of modern history at Oxford. He died at Salcombe, Devon, Oct. 20, 1894. Froude's most delightful work is in the four volumes of *Short Studies on Great Subjects, 1867-82*. He also wrote *The Life and Letters of Erasmus, 1894*; an historical romance, *The Two Chiefs of Dunboy, 1889*; and for many years edited *Fraser's Magazine*. See Carlyle; consult also *Life of Froude, Herbert Paul, 1905*. *Pron.* Frood.







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